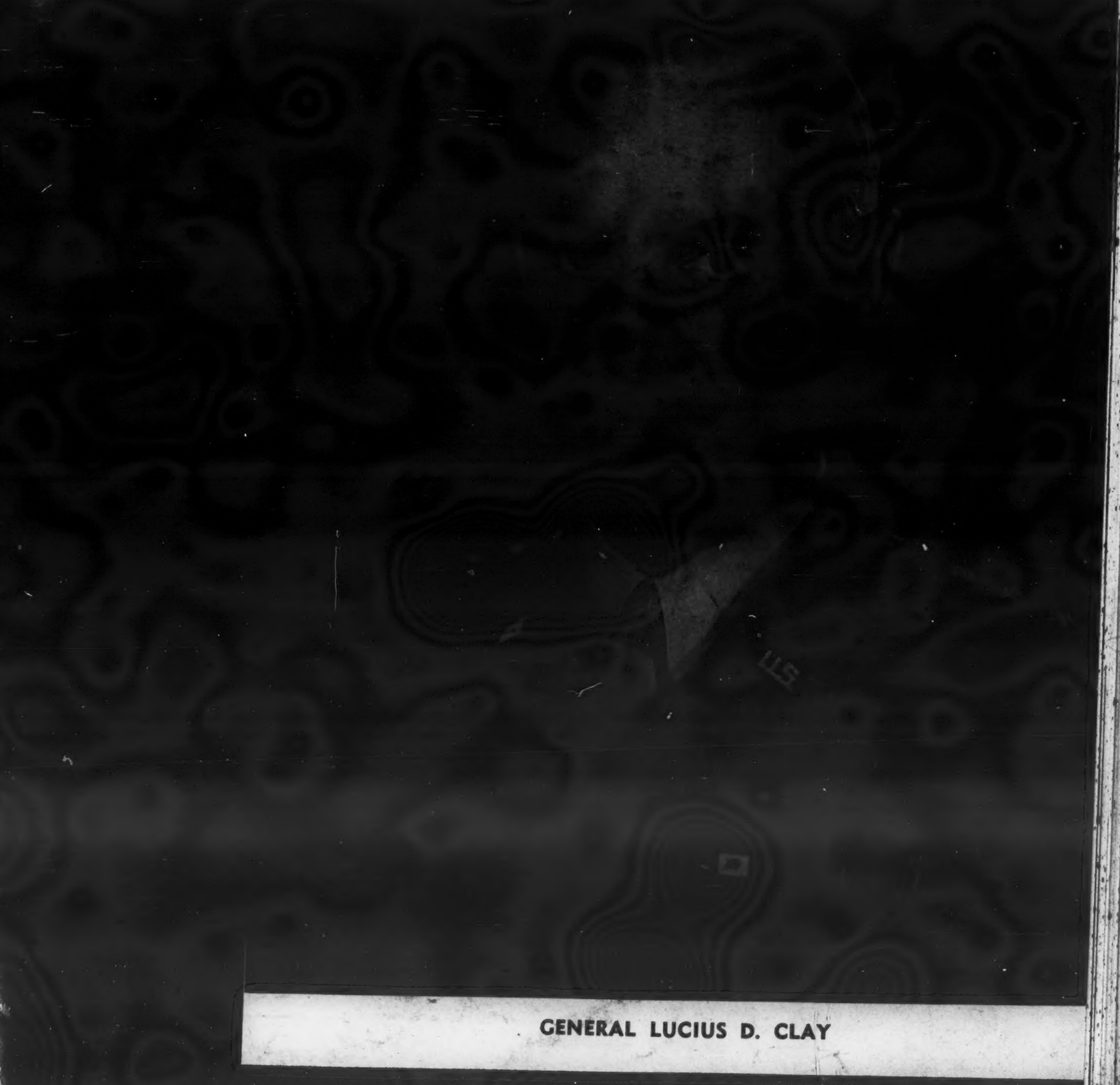
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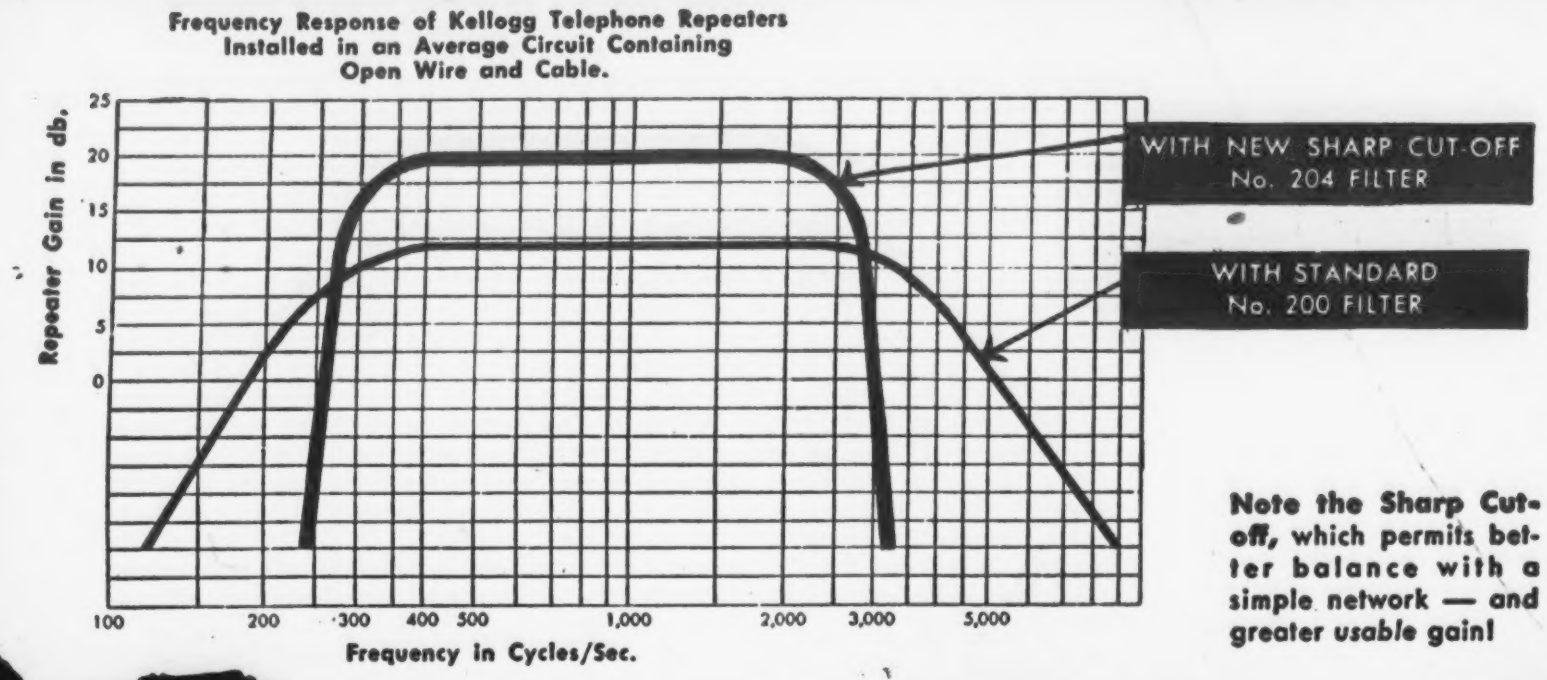
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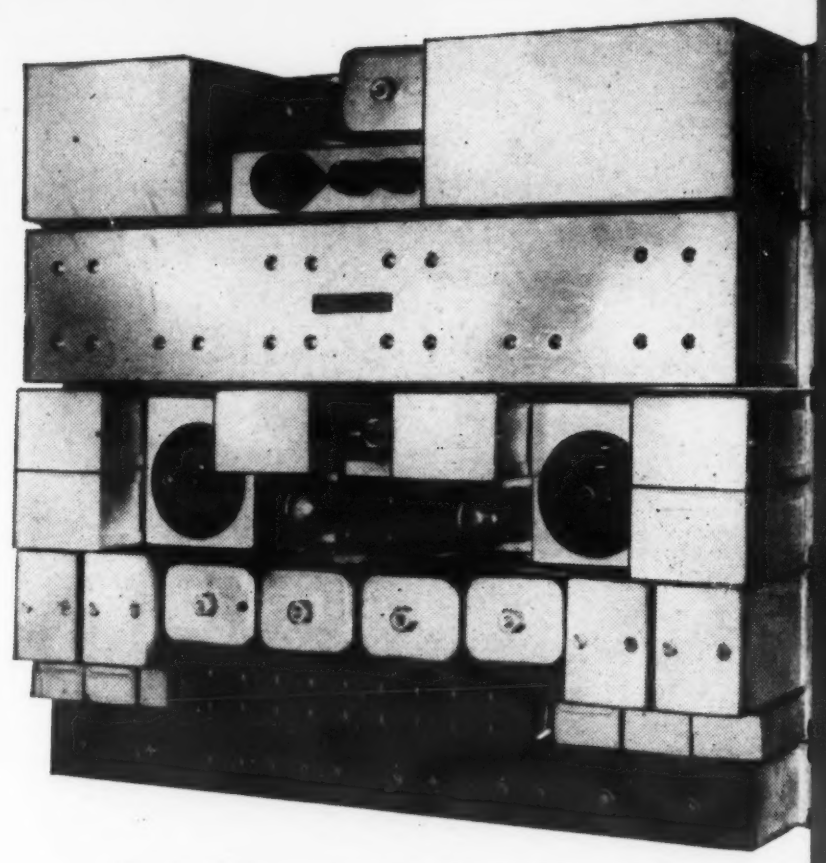


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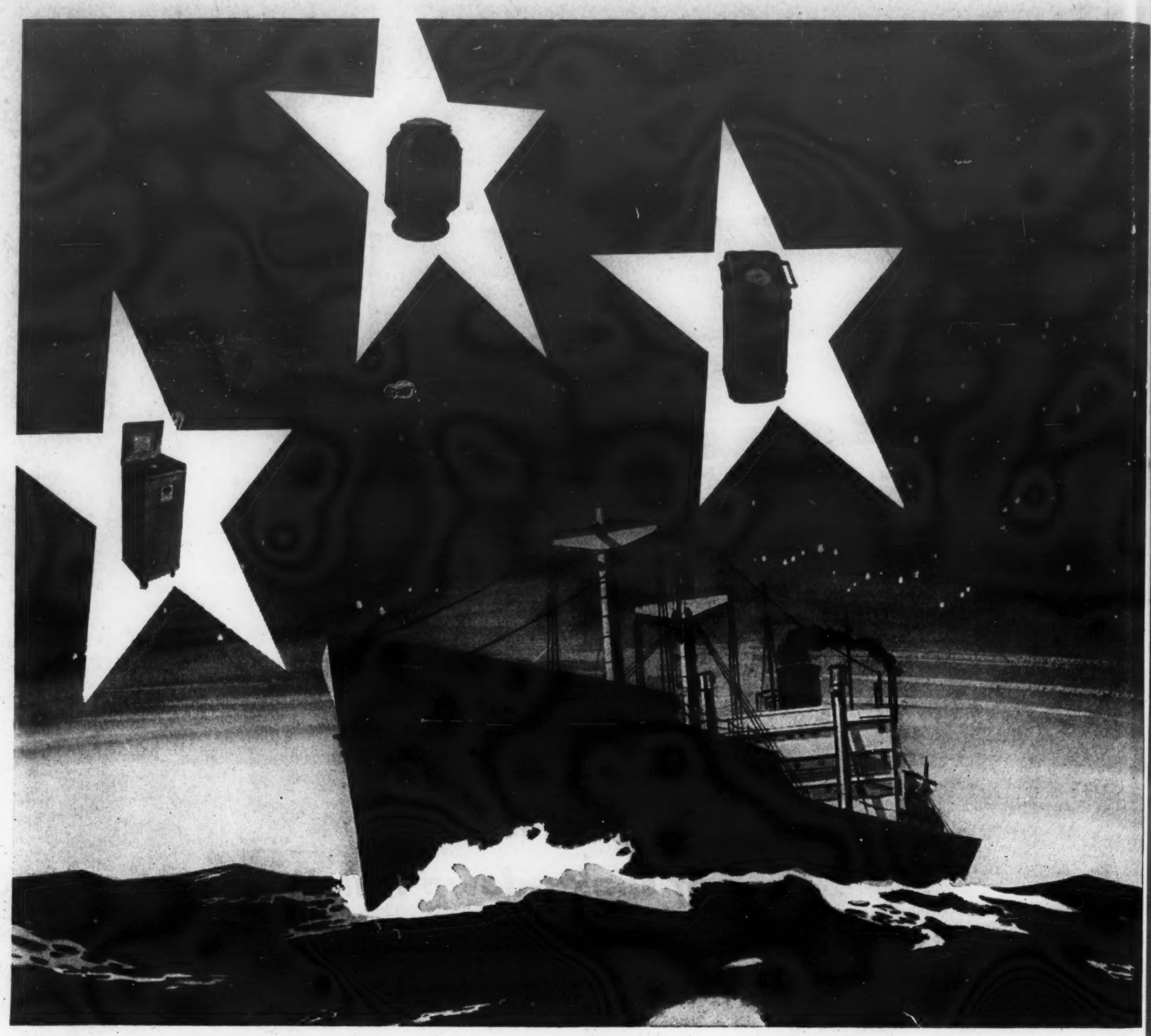
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Journal of the Armed Forces Communications Association — Dedicated to Military Preparedness

VOLUME 3 NOVEMBER- DECEMBER, 1948 NUMBER 2

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EDITOR
Brig. Gen. S. H. Sherrill (Ret.)

MANAGING EDITOR
Wallace R. Fingal

ASSOCIATE EDITORS
Gerald Egan
Signal Corps News

Comdr. Guy M. Neely, U.S.N. Res.
Navy Communications News

Capt. Ward Clarke, Hq, AACS
Air Force Communications News

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THE COVER

Man with vast responsibility, Gen. Lucius D. Clay, as CG of the Eucom is charged with holding firm and yet avoiding a clash in the Berlin imbroglio.

Single Sideband Radio Systems

...originated and perfected by Bell Laboratories and Western Electric

THE world-wide radiotelephone network which so efficiently served the Armed Forces in World War II, had as its very backbone single sideband equipment made by Western Electric.

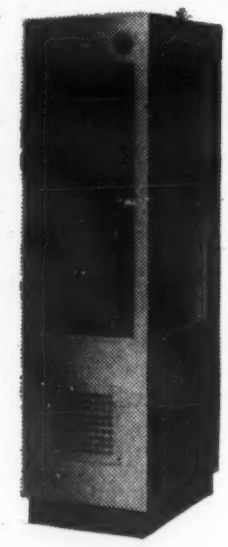
Research that resulted in single sideband was started by Bell Telephone scientists as long ago as 1915, and the first commercial application was made in 1918 in Bell System carrier telephone circuits on land lines. In 1923, the Bell System made the first transatlantic single sideband voice transmission —the beginning of today's far-flung overseas network.

Today one single sideband transmitter can simultaneously transmit as many as *three* separate radiotelephone conversations, using but little more frequency space than would be required for *one* conversation using double sideband transmission.

In addition to the Western Electric long-range system in wide use throughout the world, there is the new lower-powered medium-range equipment with which the Bell System now makes use of the demonstrated advantages of single sideband in medium—distance radiotelephony.



Western Electric Single Sideband Radio Transmitter used in the long-range LC System.



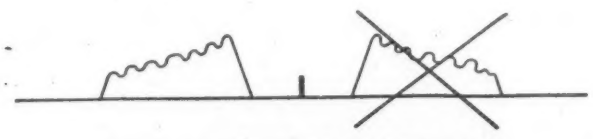
Western Electric Single Sideband Radio Transmitter used in medium-range LE System.

How single sideband conserves power



THIS IS DOUBLE SIDEBAND

Voice modulation of carrier produces two beat frequencies—the sum and the difference of carrier and voice frequencies. Transmitter is called on to produce both sidebands in addition to carrier. This is inefficient in use of frequency spectrum and wastes power.



THIS IS SINGLE SIDEBAND

(carrier reduced)

One sideband is suppressed by filters and carrier is reduced. This conserves space in frequency spectrum and provides *an improvement of 9 db in signal-to-noise ratio* equivalent to a power boost of about 8 times.

Western Electric —QUALITY COUNTS—



SIXTH ARMY COMMUNICATIONS

By Colonel Harry Reichelderfer

On a pleasant, soft sunshiny summer afternoon the seventh of February 1943, the first two of 10 trans-Pacific air transports unloaded General Walter Krueger and 20 of his staff at Amberly Field about 30 miles south of Brisbane, Australia. The semi-tropical countryside appeared rather sleepily peaceful and war seemed, in time and distance, far away. The Buna campaign had been successfully completed. Port Moresby and Milne Bay were no longer threatened by the Japs.

Brisbane itself, where we spent our first night in these strange surroundings, brought the war a little closer. The presence of sick and wounded who had been evacuated from the Papuan jungles, coupled with the awareness in the city that defeat had been so near, had left their marks. The "browned-out" city after dark presented an eerie almost ghost-like appearance, and such people and conveyances as were on the streets seemed ghost-like too.

Three years later, the 29th of January 1946, General Kreuger and 12 of the same staff officers who had landed with him in Australia boarded the USS *New Jersey* at Yokosuka, Japan, for the long voyage home. In contrast to the arrival day in the Southwest Pacific Theater it was a cold, raw winter day.

In the three years between those two days we had taken part in two major amphibious operations, directed over a score of others, and made an unopposed landing in Japan.

Joint Operations

All of the landing operations in which Sixth Army took part or controlled were joint, in that Army, Navy and Air Force elements were involved. Their pattern was always the same, with the Navy providing the lift, security en route and support during and immediately after the landing; and the Army (in one case the 1st Marine Division) elements making the assault on the beach, consolidating positions, building airfields for further operations, landing Air Force and Navy elements, and carrying on land operations from the beach head. Sixth Army was charged by GHQ SWPA with the coordination of planning for all operations, but command of its own forces remained within each element except in the overwater phase when the Navy commanded.

Planning, insofar as communications was concerned, for the amphibious part of our operations always culminated in a conference prior to the issuance of the necessary field or operation orders which was attended by representatives of GHQ, SOS, Sixth Army, the Army elements involved, the Navy and the Air Force. These conferences lasted from 24 to 48 hours for most operations, but sometimes, as in the case of the Leyte and Luzon landings, took a whole week. Every detail of communications for the operation was discussed, frequencies were assigned, tasks allotted and plans completed for coordination during the various phases of the operation. The decisions reached at the conferences were included in the signal annexes to the pertinent operation and field orders of the elements involved.

Planning was, of course, continuous throughout the whole campaign in the SWPA and the fact that we were fighting at highest pitch in one operation did not slow down the planning for the next.

Command Posts

In all, Sixth Army established and occupied 13 Command Posts, stretching from Australia to Japan. They

are listed here together with the dates they were first occupied and some descriptive matter concerning operations conducted from each.

Camp Columbia—activated 16 February 1943. No operations were conducted from this CP, but it was retained as a rear echelon and communications center for activities which remained in Australia until mid 1914.

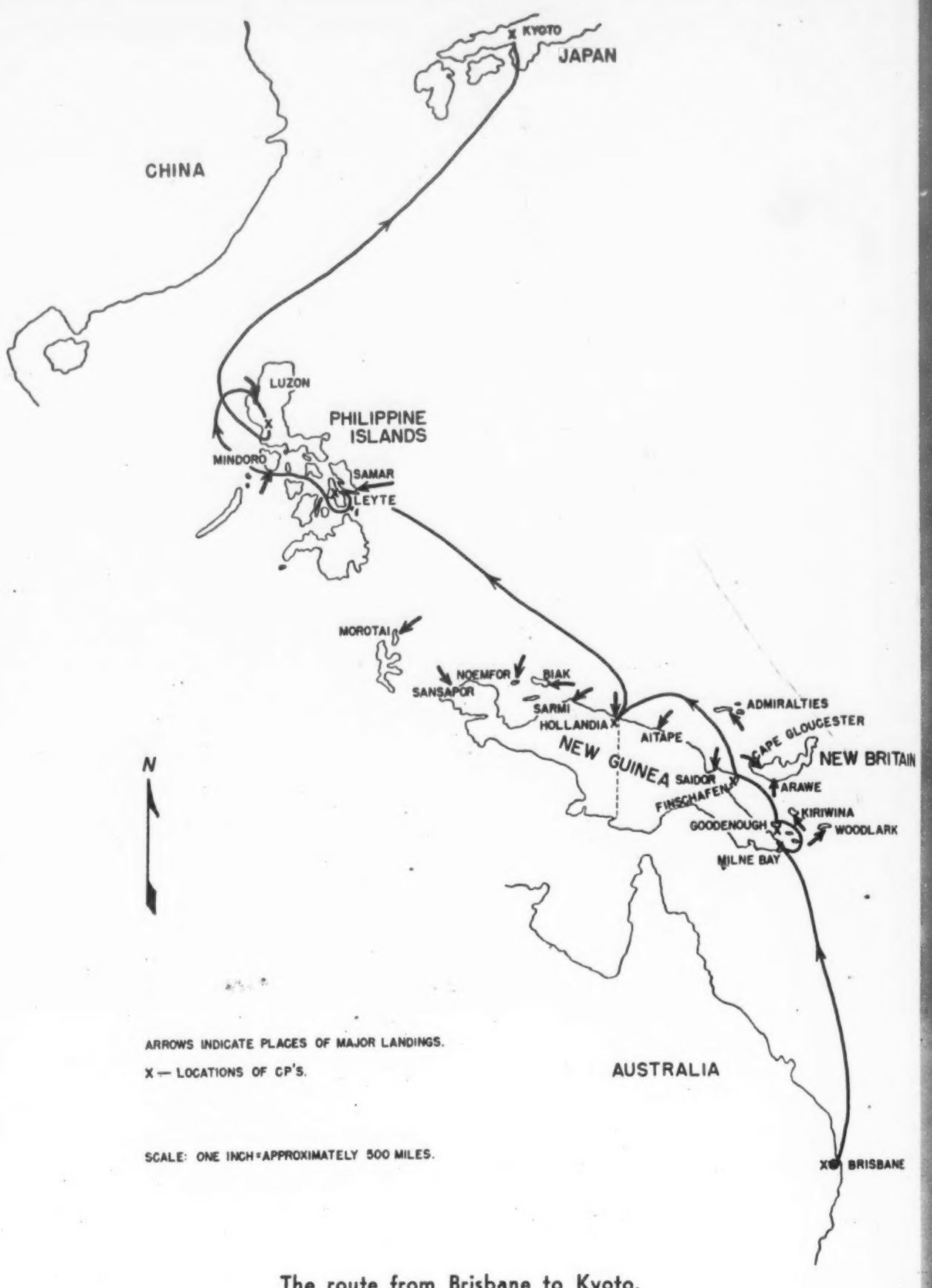
Milne Bay, New Guinea—advance detachment arrived 21 May and CP formally opened 20 June. The Woodlark and Kiriwina operations, the forces of which were a reinforced regimental combat team, each were directed from here. These operations started on 30 June and were officially closed on 4 August.

Goodenough Island — Opened 21 October. From here only the operation at Arawe on the south coast of New Britain was conducted. The landing was made on 15 December 1943 and the operation officially closed on 10 February 1944.

Cape Cretin Finschhafen, New Guinea—An advance CP was set up here on 24 December, the remainder of the headquarters closing up on it on 2 February 1944.

From the Cape Cretin advance echelon we directed the landing of the 1st Marine Division, reinforced, at Cape Gloucester on New Britain on 25 December 1944, and their subsequent operations on that island, and the landing of a regimental combat team at Saider on the north coast of New Guinea on 2 January 1944. These two operations were officially closed on 10 February 1944.

Later we launched the Admiralties operation on 29 February, with the 1st Cavalry Division, reinforced, making the landing. The Aitape landing was made originally with one regimental combat team, later reinforced to a corps, and the landings in the vicinity of Hollandia, Dutch New Guinea were made by the I Corps with the 24th and 41st Divisions and supporting troops. In addition one other operation on the north shore of New Guinea in the Wakde-Sarme area using a regimental combat team was started on 17 May 1944. In passing it should be noted that all of the operations up to this time had been short-lived; that is, the troops involved cleaned out the enemy early in their operations, and were ready to move on to other fields. This was not so, however, at Aitape where some 50 to 60,000 Japs who had been by-passed further down the coast had to be accounted for. This required the reinforcement of our troops there until a whole corps was committed. The operation was not formally closed until 25 August 1944, after some of the most bitter fighting we experienced.



The route from Brisbane to Kyoto.

Hollandia, Dutch New Guinea—An advance echelon opened here on 24 May and the remainder of the headquarters completed the movement on 16 June. Meanwhile another operation was launched by the 41st Division on Biak Island on 27 May. From Hollandia also we directed the operation of Noemfor Island on which a landing was made on 2 July, at Sansapor in the extreme west of Dutch New Guinea when the 6th Division landed on 30 July and on Morotai Island where the XI Corps with the 31st and part of the 32d Divisions landed on 15 September. The last of the operations in New Guinea and adjacent islands was officially closed on 4 October and the Eighth Army assumed responsibility for all this territory on that date.

San Jose, Leyte—Occupied 24 October 1944, less than 4 days after first troops had landed on beaches on the east coast of Leyte.

Tanuan, Leyte—Opened 1 November. We were forced to move from this area because it was urgently needed for an air field almost as soon as it was getting well established.

Tolosa, Leyte—Opened 28 November. From these three Leyte locations we directed all of the land fighting on Leyte and Samar and also one landing operation on Mindoro Island which took place on 15 December 1944.

Bonuan Boquic, Luzon — Opened 13 January after first troops had landed in Lingayen Gulf on 9 January.

Calasiao, Luzon—Opened 23 January. This CP was only about 10 miles from our landing area.

Gerona, Tarlac Province, Luzon—This was only an advance CP and opened on 3 February.

San Fernando, Pampanga Province, Luzon—Opened on 12 February

1945. From these four Luzon CP's and particularly from the latter, all of the fighting in Luzon was controlled and we remained here until we left for Japan on 14 September 1945. San Fernando was almost ideally located geographically for a Command Post in our situation. Our troops were fighting in an almost complete circle around us and our communication lines radiated fanwise to them. From here we conducted one more over-water operation to Legaspi in SE Luzon, and an airborne-waterborne operation against Corregidor and an airborne-ground assault on the Cagayan Valley of Luzon, as well as the capture of Manila, the battles in the mountains to the east of Manila, our capture of Bataan, and the battles in the mountainous area of northern Luzon. The campaign in Luzon was declared terminated on 28 June 1945, and on 1 July we turned over our responsibilities to Eighth Army, and started planning for the invasion of Japan.

Kyoto, Japan—27 September 1945. Since our landing in Japan was a peaceful one, our communication problems were simplified although we controlled about as many troops in occupation as we had in operations. Our troops were widely scattered and while we took advantage of all existing commercial facilities, they had to be augmented by our own radio and radio relay equipment.

Means of Communication

Because of the nature of our operations prior to the Leyte campaign, it was impossible to reach our subordinate elements by wire. Our wire installations were therefore small, consisting as they did of short circuits to units in the area of the Command Post and certain base type construction. This meant that radio was our primary means of communication and we maintained circuits as long as 2,000 miles and as short as 15 miles at the same time. Just prior to the Leyte campaign we had in operation 22 radio circuits radiating from Hollandia to control our troops in 11 different areas and provide rearward communication for administrative purposes. At that time GHQ was situated less than 10 miles from our headquarters and was served by wire.

In contrast, during the Leyte and Luzon campaigns radio was used only for the long haul circuits to the rear, and our subordinate and adjacent supporting elements and base activities were served by wire. Our exception to this was the extensive use of radio-link equipment with attendant carrier equipment, particularly during the landings and early operations on shore. This equipment was invaluable to our operations and we never had quite enough of it.

On Leyte, for the first time we built up an extensive wire system using for the most part open-wire copper and some cable for the shorter hauls and air force installations. Spiral four cable was also used initially, but replaced by open wire as it became available. On Luzon Sixth Army construction troops installed over 9,000 circuit miles of copper. The most effective use of circuits available was obtained by the use of CF-1, CF-2 and CF-7 carrier equipment which was furnished as a part of the radio relay and spiral-four systems.

Our wire construction job was never easy in the early days because we had to literally hack our way through jungle growth to get rights of way and always because of weather conditions. Prior to our arrival on Leyte and to some extent there, we harvested our own poles, but on Luzon we had some luck in that we found some 150 to 200 miles of concrete poles intact along the railroad rights of way which we used. We also made extensive use of metal collapsible poles which had been developed for us by the Australians. They were excellent. At no time were we able to take over any commercial wire lines which were usable. Those we found in Luzon we always rebuilt. I might add that Luzon was the only place where there were any commercial communications facilities worthy of the name. For



Col. Reichelderfer receives Legion of Merit from Gen. Kreuger.

Colonel Harry Reichelderfer, present Signal Officer of the Army Field Forces, has had a distinguished record in the Signal Corps. He was awarded the Distinguished Service Medal, the Legion of Merit, and the Bronze Star Medal for services in World War II. He served on the War Department general staff from 11 July 1941 to 27 January 1942. He graduated from the Command and General Staff School, the Army Industrial College, the Signal School, and has an M.S. degree from Yale University. He accompanied General Krueger to the Southwest Pacific to assist him in forming the Sixth Army and remained on his staff continuously until after the occupation of Japan and the return of the Sixth Army to the United States.

Big HQ On Radio Alone

those who haven't seen a large headquarters operate on radio communications alone, it might be well to enumerate just a few of the difficulties involved. First, every word had to be enciphered and when the traffic load was well over 100,000 words a day, this was in itself a tremendous task. The vagaries of wave propagation also played an important part. In a part of the world where data had to be gathered as we went along we had great difficulty in maintaining circuits for more than 18 to 20 hours a day, especially early in the game. As data became available and we gained experience, the time of inoperation decreased on the average to about 2 hours, the lost time being largely attributable to time required for frequency changes. And last, but far from least, the problem of the availability of radio channels in the spectrum was always present. Even though we coordinated every frequency available within our own forces we always had to give way for the Japs since they had no way of communicating with the bulk of their troops except by radio, either, and the available channels in the radio spectrum particularly in high frequencies never met our entire needs, to say nothing of the Japs. In this connection we never resorted to jamming although our plans always included that capability.

In all we had three ships assigned to us for communication work during our operations. The first was a converted Australian coast-wise schooner of about 75 tons, the conversion consisting of the installation of a 1 KW marine transmitter and a receiver in a well-like room below decks.* We first acquired the *Harrold* at Milne Bay and used it only to provide an emergency radio circuit back to Brisbane. Next we acquired by assignment from the Navy the PCE 850 which had been fitted out with four 750-watt transmitters, 4 receiving positions and a code room. It

joined us first at Hollandia and was used as an auxiliary command ship both in Leyte and Luzon. The communication personnel aboard handled a large volume of relay traffic for us early in the Leyte operation. They probably would have been used even more extensively but the ship was hit by a Japanese bomb and rammed by another ship on about the sixth day of operations and had to be sent to Hollandia for repairs.

Our last ship was the LSV-1 (USS *Katskill*) which operated under Navy control as an auxiliary command ship on our trip to Japan. It was fitted out with enough radio equipment to control all of the circuits required for the operation, but was not used to any great extent because the Command Ship (USS *Auburn*) provided all that was required.

We used the USS *Wasatch* as a command ship in both the Leyte and Luzon operations. Corps and division commanders were on similar ships and used the same system of communications. Command of the joint operation was exercised by direct personal contact between the Naval Attack Force Commander and the Army Commander. The Army maintained aboard ship its own signal center and radio circuits (the transmitters being supplied by the Navy) and exercised exactly the same control over subordinate units as it would have on land. Similarly, corps and division commanders commanded their subordinate units and supervised the landing of their troops. As soon as all troops were ashore and we had established the necessary channels for control ashore General Krueger and Admiral Kincaid mutually agreed upon a time for passing of command. It was reported to GHQ and we were on our own. We did not at any time during either of these operations, experience the slightest difficulty in maintaining communications.

We used air-couriers extensively in our operations as well as motor messengers when we had roads and our air-courier service was extended to each landing area on D-Day by the use of amphibious planes which landed near the command ship in the landing area. This meant also that we had to inaugurate a system of small boat carrier service in the landing areas and we carried boats in for that purpose.

Weather and Communications

All of our operations except the final landing in Japan took place in the tropics, and for more than two years we were subjected to torrid heat or torrential rains, or both, with a couple of typhoons thrown in for good measure. It was not pleasant, but the effects of the weather on communications were not noticeably bad. Personnel learned early that equipment had to be protected from moisture to operate properly, and devised, sometimes ingeniously, the ways and means of doing it. There were few units which did not have some sort of an improvised heat chamber for drying out equipment, and in general equipment was well serviced and performed as expected. From the standpoint of discomfort to the communication personnel, the heat was worse than the rain, particularly for those who had to work in blacked out signal centers and vehicles where conditions were almost unbearable. Imagine what the inside of a six ton van, housing nine radio operators, must have felt like completely closed up, with the temperature and the humidity both in the nineties.

The typhoons, mentioned above, were something to witness. They both occurred during our Leyte campaign.



Gen. Walter Kreuger, Sixth Army Commander.

The first hit only two days after our headquarters was first established ashore. It came up suddenly at night accompanied by heavy rains, and our small camp next morning was a shambles. As I recall it only one tent in the whole area remained standing and that had been kept up by the all night efforts of its occupants. Strangely enough our wire circuits were not extensively damaged by these typhoons, and then only indirectly by falling trees. Damage was repaired rapidly in both cases.

Terrain

New Guinea, New Britain, the Admiralties and the other islands over which we operated were for the most part virgin jungle and rain forest with nothing like a modern city in the whole area and settlements miles apart and reached only by sea or native trail. Mountains reached almost to the sea in many places and there were no roads of any description even near the settlements. The coconut groves which we used for our headquarters when they were available had to be cleared of dense undergrowth as much as ten feet high before we could prepare them for occupancy. The right-of-way for almost every pole line had to be hacked out of the jungle, the only exception being when live coconut trees were topped and used as they stood. In the early days, the only means of transportation were by air or sea and the air routes in many cases were over territory held by the enemy. Even on Leyte, which when we arrived boasted a few macadamized roads, rapidly became a sea of mud and a great deal of effort had to be expended merely to keep these roads passable. The

*See SIGNALS, Sept.-Oct. '47, page 35, "Command Post Fleet."

Sixth Army message center power plant, Luzon, P.I., April 1945.





Direct hit by Jap bomber on gas dump, White Beach, Leyte.

ountainous country made radio for hort distances extremely unreliable nd it was only when the utmost care the construction of antennaes was bserved that we were able to main- in it. Wire lines were continuously ubject to interruption by falling ees and in a few cases shorts were aused by palm fronds falling on the ne. It is not generally understood hat jungle growth particularly of the ain forest type is exceptionally short ooted and care had to be exercised clearing or using trees in this type f forest for pole lines. After only a inimum amount of clearing, large rees fell with very little outside rain. A single pair of wires at times ulled over huge trees, and we suf- ered a few casualties in our troop reas as a result.

upplies and Equipment

In general, equipment operated sat- factorily when properly taken care f and installed. Perhaps our great- st difficulty was getting supplies and quipment at the proper place at the roper time due to transportation dif- culties and while we at no time com- letely solved this problem and had ome very near disasters, we always anaged to get by. We were in our est position in this matter in Luzon hen we had two liberty ships com- letely loaded with signal supplies nd equipment anchored in the bay n D-Day and by the untiring efforts f my supply section we managed, ere at least, to keep ahead of de- ands. Our supply procedures were orked out by trial and error, hrough experience, and worked well. y direction of GHQ we were charged ith seeing that both the Air Force and Navy obtained the Signal Corps material they required for each operation and we made requisitions for each of their needs as well as our own. In addition we made at our headquarters the requisitions for the first 30 days of maintenance supplies for each task force and each division within the task force if it was a large one. We followed up on the requisitions by stationing Signal Corps liaison officers at depots who saw to it that the supplies were delivered to the units sufficiently prior to their embarking so that they could be loaded to accompany the unit.

Since there was a lot of construction, particularly around air fields, to be done in each operation, a large quantity of Class IV equipment was also requisitioned. Part of it was delivered to construction units prior to sailing and accompanied them on the landing and the remainder was phased into the area on later shipping. In addition requisitions were also prepared for the stocking of Signal Corps depots on a phased delivery basis. While we may have operated in this respect in a somewhat unorthodox manner, we evolved our system from experience and it worked to the satisfaction of everyone concerned.

Living Conditions

No account of the activities of Sixth Army would be complete without some mention of how we lived and worked. Our situation in Australia was ideal. Here the Signal Section and all of its operating facilities occupied a large two story building within a few yards of all the other sections in the headquarters and officers and men lived in small one story barracks buildings. In our next two years our various headquarters usually resembled a grass shack native village with a few minor refinements in sanitation. Actually in Milne Bay and Goodenough Island we worked and slept in buildings constructed of native materials and thatched roofs. About all you could say for them was that they kept out the rain. Bugs and other animals, including at one time a pet pig, had full access to them. Later on our offices and living quarters were framed tents but it was not until we arrived in San Fernando in February 1945 that we occupied permanent construction and then we requisitioned dwellings and converted some of them into offices. In all cases but one, however, our Signal Center building and telephone exchange and radio transmitters were housed in temporary buildings constructed for us by the engineers. These buildings were built to our specifications and were adequate for our purposes. Early in our operations they were sandbagged on all outer walls, and inner partitions and in one instance our Signal Center was placed under ground. We operated our facilities from vans only until construction was completed on the temporary buildings. In Japan, we occupied with the Signal Center and Signal Section, one whole floor of a rather modern office building and here working conditions were excellent.

As we progressed through New Guinea we usually installed headquarters in a coconut grove on the beach and found it to be the best location that could be desired under the circumstances. Falling coconuts were always a hazard, and we had to clean them out when we occupied a grove to prevent casualties. However, these groves were comparatively cool and shady. They offered excellent camouflage, and since we were near the beach we had swimming at our front door.

I would like to quote, in part, General Krueger's remarks to Sixth Army when our campaign in Luzon was terminated:

"My faith and confidence in the Sixth Army are unbounded; my gratitude to all of its members deeply sincere. They fought with indomitable courage, tenacity and grim determination against a fanatical enemy, frequently under the most difficult weather and terrain conditions. They have added a glorious page to the history of our country, a page filled with a record of their valor, their heroic deeds and their devoted sacrifices."

EDITORIAL

To those of us who have long felt that military preparedness is essential to the continuance of the American way of life, it is a great satisfaction to observe how the American people, through their own votes and those of their representatives in Congress, agree with that view. Of course there are a few isolated groups and individuals who still believe that the surest way to maintain peace is to dispose of all our means for protection. Others advocate such action for entirely different reasons. It was the judgment of the American people after World War I that military weakness would demonstrate to the world that we were determined to have peace. As a result, our weaknesses invited disrespect from the aggressor countries—then a wanton attack upon us, and finally our entry into the greatest war of history. In the recent election it was possible for Americans who still advocate weakness to register a vote for our disarmament. The relatively small number of votes cast for such action is now a matter of record. Yes, we have learned our mistake.

The election demonstrates that the American people have learned a bitter lesson and that they now have little patience with those who reason that lasting peace is possible through military weakness. The President and most of the leaders in both major parties expressed emphatically their views in favor of increased military strength and rearmament in these troublesome times. As we said in July SIGNALS, the Eightieth Congress made an outstanding record toward increasing our military readiness by enacting unification legislation, the selective service law, and appropriating nearly $14 billion for defense, including $200 million for communications equipment and $32 million for research in that field. Great strides forward have been made toward industrial mobilization by the National Security Resources Board and the Munitions Board and by industry. The Eighty-first Congress will undoubtedly move ahead toward ensuring peace through military and industrial preparedness by enacting promptly additional legislation considered essential by our military leaders. There can be no doubt, now, in the minds of any of the leaders in an aggressor state that we mean to make America stronger. General Bradley sounded the keynote at Chicago October 28, when he said:

"Our only alternative to hopeless vacillation is a stable long-range military policy in consonance with our needs and our ability to support it. If we are simply to respond to crises after they have erupted, we shall be forever toying with the danger of explosion. A single division for the prevention of war is worth a dozen divisions for fighting a war.

". . . It is the responsibility of your military forces to devise what they can conscientiously claim is adequate and reasonable provisions for the security of this nation. And it is your responsibility to adjudge whether that provision is warranted by those disturbing acts in world affairs.

"Obviously the cost of military requirements are hig even though they be fixed at minimum needs. And i would be useless to deny that these security needs are i open competition with social progress, that appropriation for military expenditures exert a strain upon the nation' economic health. Yet, I must ask you—what is the valu of social progress, what is the value of a sound economy, if eventually we are destroyed through neglect of our security needs? We dare never forget there is nothing we can create by our talents, nothing we can devise through science, nothing we can achieve through knowledge that war—if it comes—cannot destroy. We readily recognize that there is a reasonable limit to what the nation can safely spend for defense during this prolonged period of tension. But at the same time, it is quite clear that this ceiling cannot be fixed by economic equations alone. Prevention is notably cheaper than the ordeal of fighting a war."

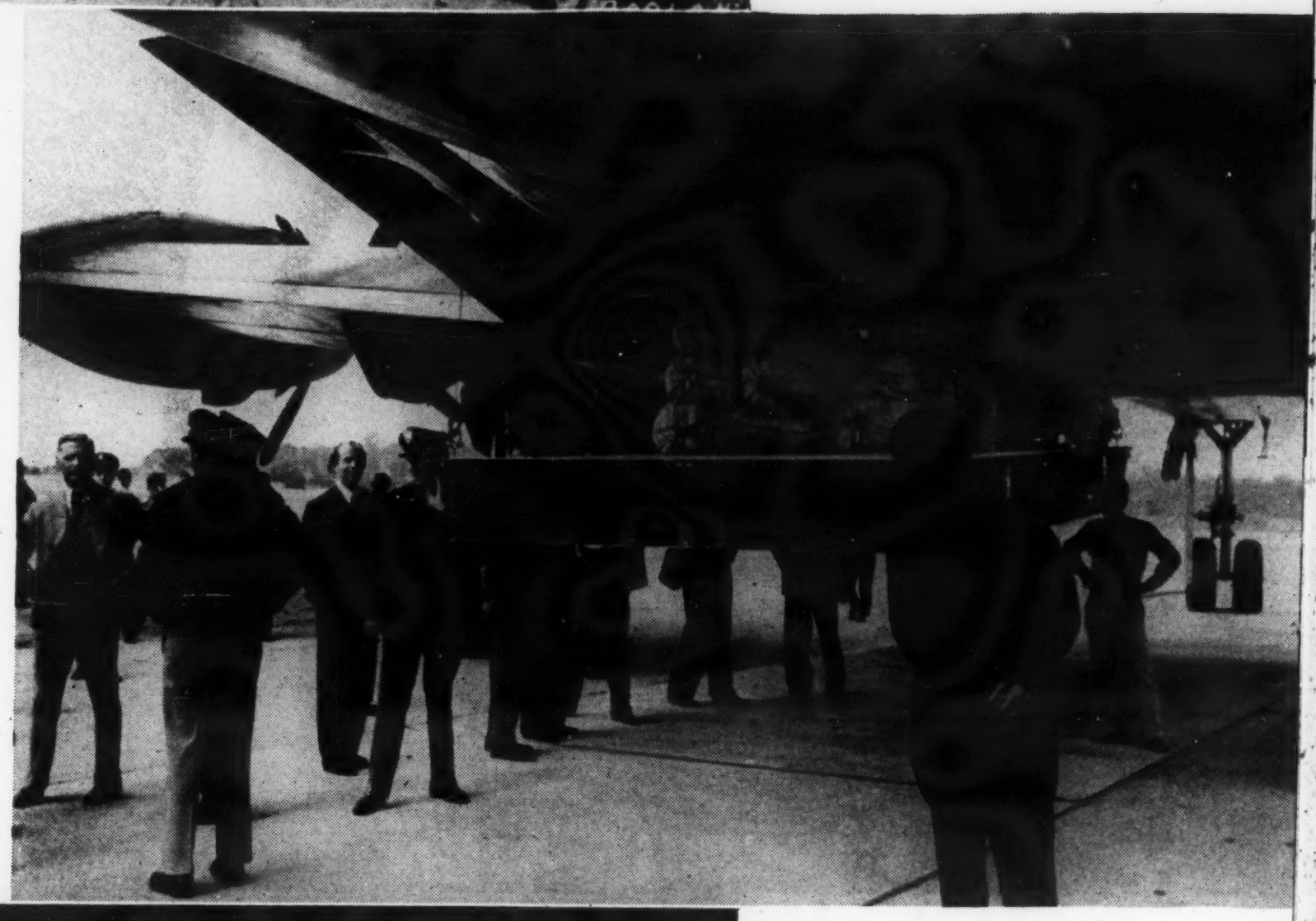
Meanwhile we can be grateful that General L. D. Clay, whose photograph appears on our cover, was chosen to make decisions and act for America's welfare in the key area of the world of today. He has demonstrated again and again that he is a brilliant, fearless leader, devoted to his country's welfare and to service to America at no matter what personal cost to himself. He has those qualities which characterized the early Americans who conquered the wilderness and established the U.S.A. He expressed the philosophy of the American people today when he said in New York on October 21st:

"It is not my lot as a soldier to make war or to create the incident which may lead to war. I am proud of the forces which I command in Germany because I know that they have high discipline, sense of purpose, and can be depended upon to take no hasty action. At the same time they stand firm in position as the evidence of the sincere belief of the American people in freedom, and of their readiness once again if necessary to prevent free people from being trampled down by aggressive forces.

"There is no easy road to lasting peace. It can not come overnight. Nor can it be obtained by written agreement left to be interpreted by each participant in his own way. It can only come about when the free people of the world are strong and thus able to defend their own freedoms and that day is approaching rapidly. Certainly never in the past, and perhaps never again in the future, will the responsibility of America to preserve the beliefs it holds most dear be as great and as difficult to exercise as today. However, with wisdom and with unity rare in our history among major parties and national leaders, our determination is becoming clear to all the world. It is providing courage and faith for those who now have freedom, to hold it dearly; and for those who do not now have it, to keep alive and desire in their hearts."



With Christmas approaching these Wacs are apparently selecting a guest of honor. The big fellow, right foreground, seems a likely candidate.



Berliners are not likely to feast this Christmas, but planes like this C-74 carrying in food will keep them from starving.
The C-74 is the only plane equipped with elevators for loading and unloading.



1st Signal Company, 1st Infantry Division, gets the jump on the holiday season by way of a 50th birthday party. Running a knife right into the middle of the 50 is Maj. Gen. Frank W. Milburn, CG of the 1st Division.



Top: The Zugspitze is the name of the mountain. It's Germany's highest. Bivouaced right alongside of it is the 26th Regiment of the 1st Infantry Division.

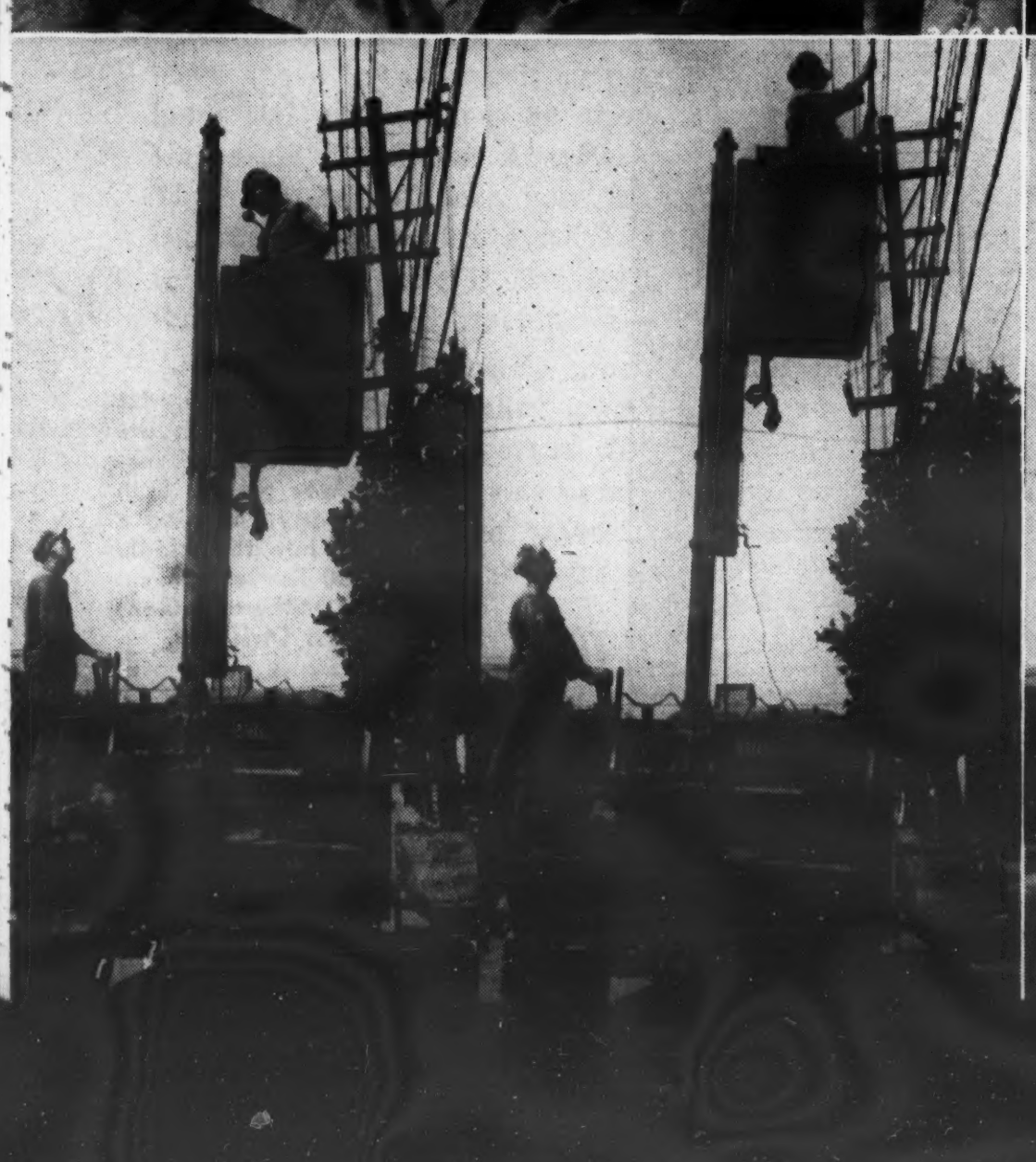
Center Left: The camera catches Maj. Gen. Jerry V. Matejka, Chief Signal Officer, Eucom, in an informal pose at the final critique on a maneuver in Germany.

Center Right: Maj. Gen. Spencer B. Akin, the Army's Chief Signal Officer, gets an Oscar for a Signal Corps medical film judged best in its class at an exhibition in Italy. Lt. Col. Umberto De Martino presents the statuette, and looking on is the Surgeon General, Maj. Gen. Raymond W. Bliss.

Bottom: Men of the 76th Signal Service Battalion demonstrate American ingenuity by utilizing a K-44 earth-borer for aid in wire repair in Seoul, Korea.











With the far-flung activities of WW II still fresh in mind it hasn't become necessary for the Navy to revive its prewar recruiting slogan, "Join The Navy And See The World." If they ever do they have pictures such as these to back their claim.

Top: U. S. destroyers visit Monaco on the French Riviera

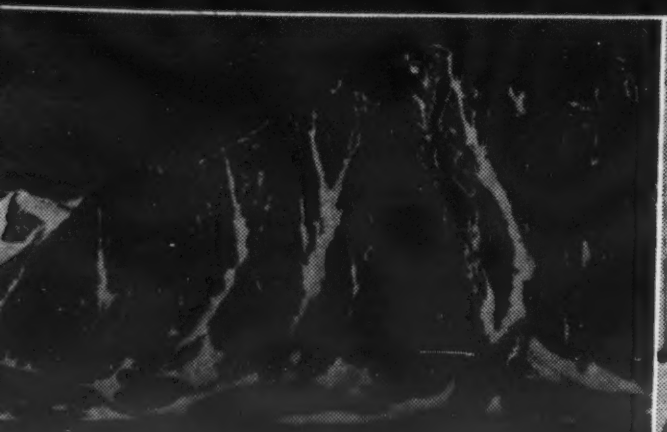
Center Left: Sailor and marines visit the Parthenon, Temple of Athena, at Athens, Greece.
Center Right: Sailors see an ancient shrine at Polomaruwa, Ceylon.

Bottom Left: U. S. Navy ships in the Antartic. The mountain, looking like a painted backdrop, is unnamed.

Bottom Middle & Right: More views of the Parthenon, principal temple of the Acropolis.

















DOGS IN SERVICE

The tough pooch above isn't in an ugly mood all the time. He's trained to show all his teeth when approached while his master isn't around. He's at the QM Dog Training School, Darmstadt, Germany.

The more pleasant looking dog with the sailor is also in Germany. They're standing watch at Bremerhaven.

All bound up in casts and looking a bit unhappy is Master Sergeant Mascot of Company D, Student Training Regiment, Fort Monmouth. The men in his company saw no reason why they should dispose of him just because he broke a leg.



Modern Research Facilities of Federal Telecommunications Laboratories

By H. H. Buttner

With the opening of the 300-foot luminum-sheathed microwave re-arch tower on May 19, 1948, at the w Federal Telecommunication Lab-ratories in Nutley, New Jersey, a nique approach to high-frequency dio propagation experimentation as inaugurated. The new tower con-itutes a research laboratory in the y; its 5 upper levels and roof ex-nd between 200 and 300 feet above e surrounding terrain. It may, erefore, be described as a building top of a tower, the top level at a height equivalent to that of a 30-story building.

Like light rays, ultra-high-frequency radio waves travel in substantially straight lines making their range virtually limited by the horizon and they are, therefore, most effectively propagated from and received at places located high in space, particularly for communication over any appreciable distance. Heretofore, sites atop mountains and tall buildings have been employed for microwave research, or the antennas have been placed on tall masts. But mountain tops are inconvenient for day-to-day experiments because of their remoteness and inaccessibility as well as their susceptibility to the extremes of weather. Building tops also present many limitations, such as interference caused by the reflection of waves off nearby structures, possible disturbance of existing radio services, and the difficulty of complying with local governmental regulations. Masts, because of their instability, inaccessibility of the structures mounted on top of them, need for supporting wires, and the necessity for long



Corner of laboratory showing large amount of natural illumination provided.

transmission lines between apparatus and antennas, are poor devices for precise measurements.

Tower in Original Plans

When plans for the new laboratories were first drawn up in 1943, a rigid tower for microwave experiments was included. At that time, the laboratories were busily engaged on radar, high-frequency direction finding, and other similar wartime developments. Since then, interest in microwave techniques has increased rapidly, not only for radio navigation with such devices as distance-measuring equipment, assisted radar, and Navar, but also for television, especially ultra-high-frequency color television, frequency and pulse-type modulations, and facsimile systems for broadcast, point-to-point, and relay operation. An extensive microwave program has been adopted by the armed forces of the U. S. A. and during the next decade will involve contracts with private industry of about a thousand million dollars for research and development. It is evident, therefore, that the concept of a tower as an essential unit of a complete electronics laboratory was both correct and foresighted.

The laboratories as first conceived were to consist of two major divisions, a central part supplying a number of common services and a group of research units. In the common section were to be included technical and administration, maintenance, security and personnel, main incoming power, heating, fire detection and protection, compressed air and gas, and similar services. The first idea was to house these common services in a single building as a center surrounded by the laboratory and research buildings. The tower was to be located on top of the central building.

At this point, architects were consulted and the problem was presented as one of engineering a highly functional group of structures combining extreme flexibility and low maintenance. The first design drawn up by the architect provided for a circular central building three stories high with laboratory wings on either side. The tower was to be an open steel structure with two glass-enclosed floors at the top. This first plan would have permitted a total of seven laboratory wings to be built radially at 45-degree angles to each other; the eighth radial would have been omitted to provide for the main entrance.

When this initial plan was presented, it became apparent that it had a number of disadvantages. First, as wings were added, the windows on the first floor of the central structure would have been blocked out so that ultimately the whole floor would have been without outside lighting. Secondly, construction of the steel tower on top of the main building would have had to proceed at the time of the erection of the main building. The tower could not have been built afterwards because of the danger and difficulty involved in carrying on construction while the building below was occupied. Thirdly, the appearance of the open structure on top of the building was considered unsatisfactory. Fourthly, the architect recommended against wings at 45-degrees from each other because such construction introduced complications in the steel framework.

Functional Design

In considering the original design further, it was felt also that the general architectural conception was not modern enough and that, as long as new laboratories were being constructed, they should be as functional as possible and should indicate some degree of independence from the classical method, provided there was justification for such a departure.

After several modifications and revisions were considered, a plan for the buildings was approved. The plan provided for an oblong central building with a group of laboratory wings at either end. In these later plans, provision was made for an independent tower to be erected close enough to the central building for easy access but far enough away to be constructed independently. However, since the permanent tower could not be built immediately owing to governmental wartime building restrictions, no further designs were considered at the time. Work on the first two buildings was started in November, 1944, following the approved plan. These buildings were occupied the following spring. To provide immediate facilities for microwave research, a 200-foot temporary wooden tower was built nearby.

When the first two buildings neared completion, it was decided to plan for two additional wings. As this construction was to proceed after V-J day, it was possible to include a number of items that could not be considered during the war, that is an appropriate entrance lobby, an auditorium, and the permanent tower. The four buildings now completed provided 130,000 square feet of gross floor space and comprise the largest group of metal-sheathed buildings in the world. Flexibility has been provided in the building site plan so that additional buildings may be added without impairing the symmetry of the group.

Aluminum for Outer Walls

Although utilizing conventional steel framework, the buildings depart in other ways from normal constructional design. The final plans specified a large amount of glass for the laboratory exterior plus a suitable material in the form of plates for the outside walls. Among the materials considered were an asbestos-cement compound and enamelled steel.

It was found however that at the particular period of the war when the buildings were to be started, an excess of aluminum plates was available. Investigation of aluminum for the outside wall covering revealed that samples of this material submitted to exposure in an industrial area from 10 to 15 years tarnished progressively, but not to objectionable proportions. After this period of time, it is possible to restore the original appearance by application of a suitable finish. Actually, such refinishing may not be necessary since the action of wind and dust on the

buildings seems to constitute a continuous polishing agent. Aso, it was realized that the aluminum surface would give a fair degree of shielding to the inside rooms against external radio fields produced by nearby radio stations, which measurements showed to be of the order of one-tenth volt per meter. Shielding between laboratories was also effected through the use of metallic partitions. With the use of all-steel flooring of the Robertson type, shielding between floor would also be effected.

The exterior walls, therefore, consist of panels made up of an outer covering or skin of aluminum, an insulation space filled with Fiberglass, and a backing of steel. These panels are two feet wide and are erected vertically, usually as spandrel sections.

The ceilings of the buildings are of the suspended type, utilizing metallic acoustic panels, which may be removed whenever access is desired to the ceiling space. The space between the suspended ceiling and the underside of the floor immediately above is utilized for air ducts, special ventilating equipment, sprinkler pipes, and other service and heating pipes.

Provision is made for distribution of hot and cold water, compressed air, illuminating gas, nitrogen, hydrogen, and oxygen. There are facilities for the detection of the presence of inflammable gases through the use of a detector that samples the air in each area where gasses are used and analyzes the samples several times each minute. In the event of inflammable gases escaping in dangerous proportions, an alarm automatically sounds and a light on the main gas-detector panel indicates the space in which the leak is occurring.

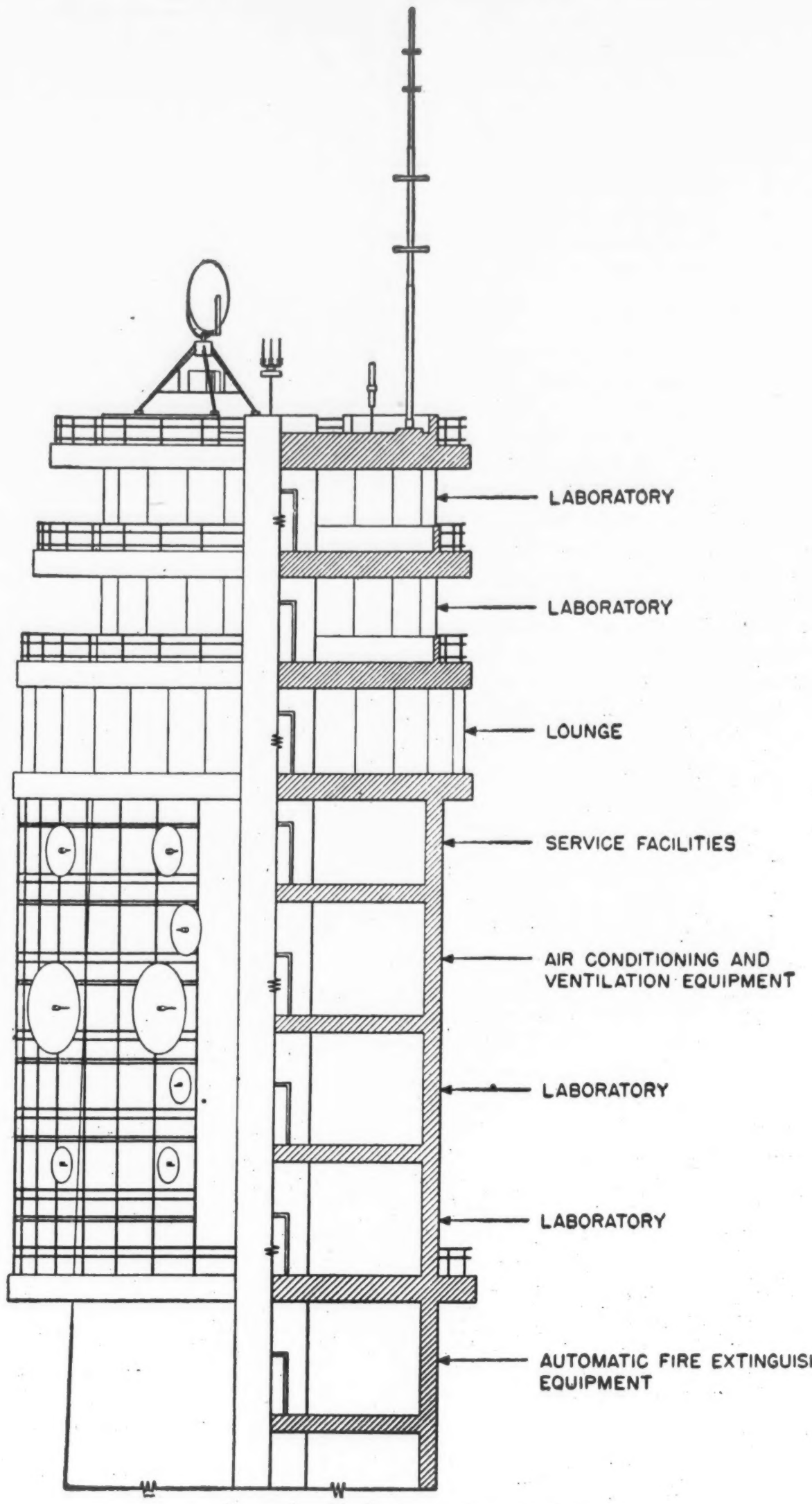
Flexibility with Six-Foot Module

To obtain maximum flexibility, a system of removable dividing partitions is used. These allow the size of rooms to be changed with relatively little effort and without destroying the wall material. A six-foot space module was established. The first building, constructed during the war, employed Transite wall paneling for interior wall liners, while the later buildings have steel wall liners. The module was respected in designing heating, lighting, and sprinkler systems so that each module is self-sufficient in these respects. In other words, modules can be combined in any desired arrangement without the need of changes in these three basic services.

A maximum of natural lighting is provided through use of large window areas. Artificial lighting, in addition to conforming to the six-foot module, provides complete flexibility with a unit. The basic lighting unit is a fluorescent fixture with two four-foot tubes set flush with the metal-pan acoustic ceiling. The fixtures are of the snap-in type and utilize the same supports that carry the hung ceiling. It is a simple matter to replace two ceiling pan units with a lighting fixture at any location.

Varying from usual practice, the light switches are located in the corridor. At each column, there is a two-foot wall section that is not movable and provides a fixed position for these switches. Thus, partitions may be moved without involving electrical changes. The switches are, however, coordinated with the six-foot module system.

Electrical distribution throughout the laboratories is by means of a four-wire grounded-neutral system supplying 208-volt, three-phase 60-



Upper levels of microwave research tower.

cycle alternating current. Thus, 120-volt, single-phase alternating current may be obtained between any phase wire and neutral. A substation is provided for each of the buildings and for the tower. The primary voltage of each substation is 4,150 volts. Facilities are available for supplementary substations should the load require additional power capacity.

Fire Prevention System

The sprinkler system was the subject of special attention, since there are few places where water would cause more loss in both time and money than in an electrical laboratory. The rate-of-rise maximum-temperature system was, therefore, installed to prevent unnecessary water damage. In this system, the rate of temperature rise actuates the controls rather than some predetermined fixed temperature. Any abnormal temperature rise would start the following chain of protective measures.

A. Fire is detected by rate-of-rise heat detectors.
B. An alarm is sounded, indicating the fire zone in which the trouble is located.
C. Water is allowed to enter the sprinkler lines.
D. The water is held back until either
   a. manual extinguishing efforts succeed, in which case the sprinkler heads do not open and water damage is prevented, or
   b. the sprinkler links fuse and water under high pressure is sprayed in the affected area.

The heating plant is a steam and high-vacuum system using fuel oil. Controls permit the adjustment of the temperature in each room.

At the time the lobby and auditorium were being planned, two new basic designs for the tower were also drawn up. One was for a square main shaft with square buttresses and the other was for an oval structure. The towers in both cases were to be totally enclosed providing ample working space in a series of levels. Both designs appeared to have merits, but the oval shape was chosen because it lent itself more readily to experiments in all directions while the square shape might have made it difficult or impossible to operate in certain directions.

Optimum height of the tower for the location was determined through experimentation on the 200-foot structure. These experiments showed that heights between 200 and 300 feet would yield satisfactory results for research in all but one direction.



Typical office area. Walls can be moved to expand or contract the space as may be required.

This height would not be great enough for signals to scale the Watchung Mountains to the west. A tower tall enough to do this was considered economically and structurally impractical. Since research was to be carried on chiefly in the southeasterly direction toward the International Telephone and Telegraph Building in lower Manhattan (New York City) and the field station at Telegraph Hill (Hazlett), New Jersey, the 300-foot height was chosen.

Tower Design Unique

The task of designing a high steel tower with a comparatively narrow base presented a number of interesting problems. Foremost among these was that of weight distribution. With 75 per cent of the weight concentrated between the 200- and 300-foot levels, the necessity to provide adequate support was a major consideration. For example, architectural engineers estimated that during high winds the uplift stress on the foundation might well run into several hundred tons. As a result of these calculations, a tension anchorage was developed that is probably the most unusual feature of the entire construction.

The main columns of the tower are anchored in a reinforced concrete mat 10 feet thick. Uplift loads are carried by reinforced tension cylinders extending approximately 30 feet below the foundation mat into bedrock. The rock layer in this area is said by geologists to be thousands of feet thick.

To construct the anchorage for the tower, a well driller drove 24 holes each 14 inches in diameter into the ground. Twelve large steel rods were lowered into each hole and a special type of concrete, which expands on hardening, was used to anchor the cylinders in the surrounding rock.

The frame of the tower, including columns and bracing, is made of structural steel of standard rolled shapes. Roof and floor slabs are reinforced concrete on steel beams; the upper levels employ slightly different framing because of depressed floors and overhanging balconies.

The south balcony at lower landing is supported on a cantilever extend 12 feet beyond the column supports and the resulting uplift on the main floor girder is reacted by an inverted K-frame to the floor above. The south columns above the main landing, having a design loading of over 200 tons, are carried back to the main columns by cantilever girders. Resulting uplift on the main floor girder is counteracted by a tension tie to a K-frame two stories below.

Rigidity of Tower Essential

Because of the exacting nature of the work to be conducted in the elevated laboratory—notably the use of sharply focused beams—rigidity of the supporting structure was of paramount consideration. A primary design requirement, therefore, was limitation of both static deflection and amplitude vibration under a wind velocity of 80 miles per hour. This was dictated primarily to avoid any major interference with focussing operations during stormy periods.

Accordingly, the allowable wind stress in the columns and bracing was so calculated that, with the maximum wind load from any direction, total deflection at the top of the tower would not exceed 10 inches. These calculations, taking into account the unusual weight distribution at the top of the tower and the eccentric loaded projection on the north-south axis, involve both normal and tor-



Auditorium may be used for lectures and demonstrations or for studio for sound and television broadcasting.

sional inertia loads as well as actual wind load.

In considering these special conditions, original formulas had to be developed to approximate the amplitude of vibration that would result from periodic and unbalanced wind pressures that would add to the static deflection of the tower under a steady wind load. The period of oscillation of the tower involved calculations based on inertia forces of the elastic center of gravity and the elastic center of oscillation. This was computed to be about 3 seconds, exclusive of the damping effect of the bracing system and the applied wind load. On the basis of these assumptions, it was determined that the maximum static deflection would be about seven inches in addition to an amplitude of vibration of about three inches.

For beam antennas, vertical supports are provided between the lower landing and the main landing, standardized as to spacing and serviced by steel walkways. The pipe supports are attached to the cantilever balcony curb. At present, they are installed only in the southeast quadrant, but provisions have been made for setting them up all around the tower. A cargo boom located on the roof permits a parabola or other type of antenna structure to be hoisted to the point of location. The accessible walkways then permit easy location of the antenna in any chosen position. The boom is also used to haul materials to the roof.

An automatic electric elevator with a speed of 500 feet per minute provides rapid access to the upper levels. The car has a capacity of nine persons or 2,500 pounds and will accommodate standard 29-inch bays for transportation to the research levels. Each research floor provides 1,000 square feet of laboratory space.

Practical as well as aesthetic considerations dictated the choice of aluminum as the outside covering for the tower. Rolled sheet aluminum sections not only provide the required enclosure for elevator and stairwell, but afford weather protection to the steel frame, thus reducing maintenance to a minimum.

The laboratory space is steam heated on the two upper landings, while the roof has been provided with snow-melting pipes in the concrete. Both electricity and hot and cold water are supplied to these areas. Extensive fire-protection equipment has been provided throughout the tower. The water pump, elevator relay controls and motor generator, flood-light controls, substation, and other service equipment are located in a lower part of the tower. Water is pumped to a pressure distribution tank located at the 230-foot level and distributed from there.

Glass-Enclosed Landing

The main landing is entirely glass enclosed and air conditioned. This area forms an observation room providing a wide view of New Jersey, New York harbor, and the New York City skyscrapers. Decorated in a modern style, in keeping with the impressive functional design of the tower and buildings, this level may be used to demonstrate equipment as well as for research. Included in the decorative scheme is a large mural, symbolizing the progress of electronic science through the centuries, painted on stainless steel by Mrs. Buell Mullen, well-known designer and artist who introduced the technique of painting on stainless steel. A number of her murals are on exhibition in the Library of Congress and in other governmental buildings in the U.S.A. and also Latin America.

A floodlight trench circles the tower at its base to provide projected incandescent illumination, while a blue cold-cathode light strip extends vertically to the top. The tower, then, becomes an impressive beacon at night, its spectacular beauty dramatically mirrored in a large, gracefully curved reflecting pool at its northern edge.

The laboratory buildings and tower are located on the site of the former Yountakah Country Club, whose rolling lawn and tall, stately shade trees have been preserved. The lawn provides auxiliary outdoor areas for field tests and experiments with mobile and portable equipment.

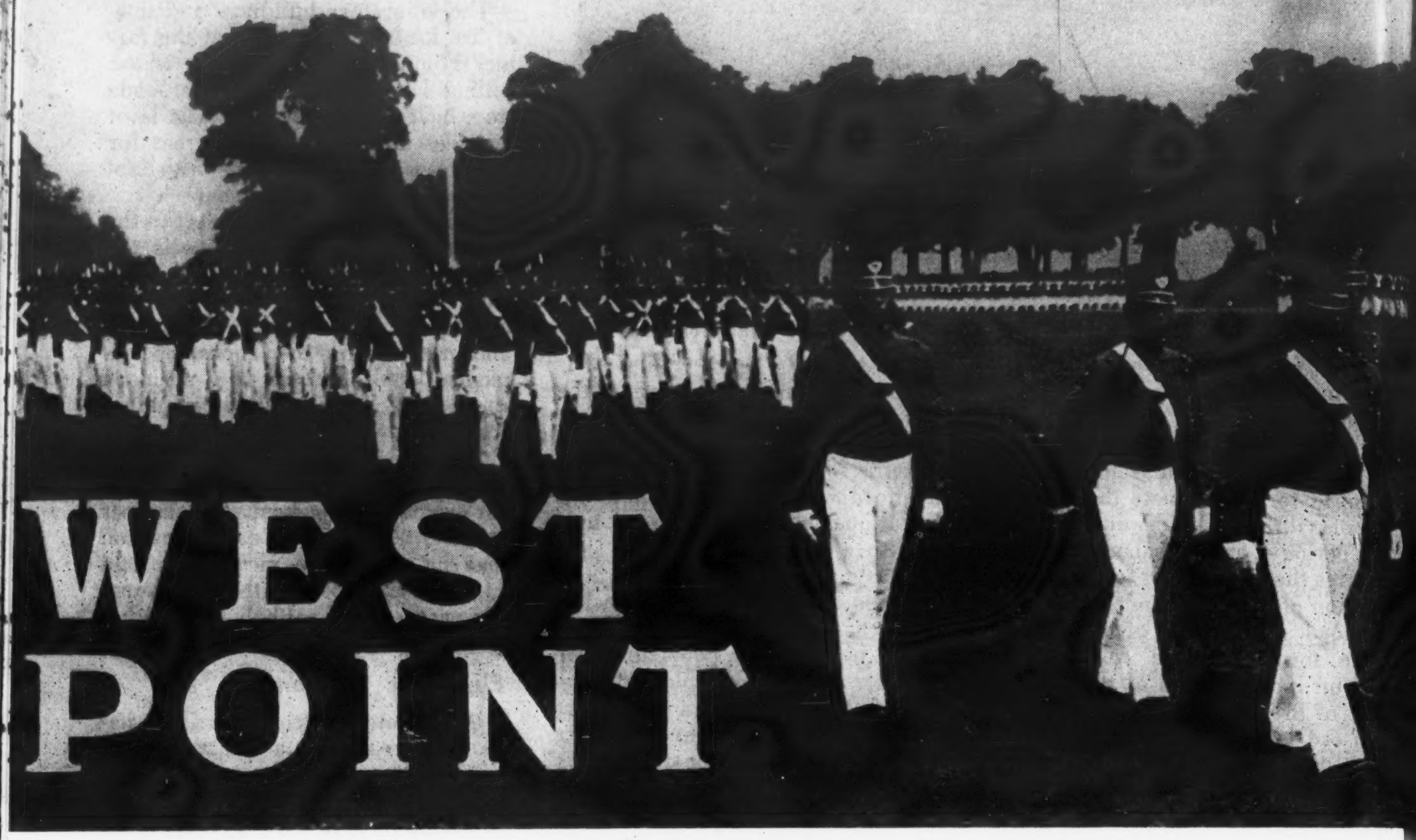
Located several hundred feet to the southeast of the laboratories is the club house of the former country club. A large rambling colonial-style building, it now houses the restaurant and cafeteria for the laboratory employees. Also, there are spacious rooms, which are used for employee recreation. Directly adjoining the club house is an outdoor swimming pool available to laboratory personnel for evening swims during the summer months. An outdoor dance pavilion may be used when picnics are held in the grove. Behind the club house are areas for softball and other games.

Electronic Carillon

A 25-note electronic carillon has its loud-speakers attached to the topmost railing of the tower. With an audible range of approximately 12 miles, its musical tones may be heard in the surrounding community as well as on the laboratory grounds. At hourly intervals the carillon tolls Westminster chimes and musical selections are played on it each noon and evening. So, besides being an efficient facility for research, the tower fulfills the function of the campanile, familiar to old-world communities and now present in some form on almost every college and university campus in the U.S.A.

Less than 20 miles from New York City, surrounded by pleasant and healthful countryside, and in the midst of desirable home communities, the new Federal Telecommunication Laboratories are located in an atmosphere stimulating to scientific development. Since the products of a laboratory are discovery, invention, and design—creations of the intellect—the environment for its scientists and engineers is as important as the tools with which they work. In the new laboratories, the two needs may be said to have been ideally fulfilled, for not only has an advanced, functional, and well-equipped group of buildings been provided, but they have been placed in a setting that makes for a pleasant place to work and live.

POST-WAR WEST POINT



This article by the Cadet Press Detail was prepared for SIGNALS at the special request of the Editor. That the Military Academy is keeping abreast of the times is very well illustrated by the recently completed electronics laboratory. Well before the discussions which led to the postwar course, the Professor of Chemistry and Electricity recognized the necessity for more extensive instruction in electronics and in 1943 initiated the construction of an electronics laboratory. Maj. General H. C. Ingles, then Chief Signal Officer, was instrumental in the establishment of the laboratory and in the procurement of important items of equipment.

A similar article on postwar training and the study of electronics at Annapolis will appear in an early issue of SIGNALS.

The annual AFCA award for excellence in the study of electronics at the Military Academy has for its purpose emphasis on communications and their importance.

In 1949, AFCA's awards for excellence in electronics study will include the Naval Academy as well as the Military Academy. [*Ed. Note*]

Upon returning to West Point, the pre-World War II graduate of the U. S. Military Academy finds that some rather profound changes have occurred at his Alma Mater. The under-lying principles, embodied in the motto, "Duty, Honor, Country," remain firm; but the lessons of World War II have had a smashing impact upon both academic and military instruction. Perhaps the most sweeping changes have been in summer tactical training, where instruction has been broadened to include Air Force, Navy and combined operations.

In academics, the cadet is today better-equipped and better-instructed than ever before. Taking electricity as a sample course, the new electronics laboratory, completed in 1945, provides an excellent proving ground for the theories of the classroom. During the second class, or junior year, cadets at the United States Military Academy receive a year's course in electricity. This instruction is strengthened and increased by the practical military training received during the summer months, since electricity and electronics today play such a large part in any practical military operation.

Upon entering the Military Academy on the first week day of July, the new cadets receive two months of intensive military training. This corresponds roughly to basic training in the Army and will be discussed at greater length later in this article.

The second summer is devoted to tactical training of the now third classmen (sophomores). Instead of being conducted near the cadet barracks, as in the years before the war, the training now takes place at a summer camp. Located seven miles west of West Point, it is named in honor of Lieutenant General Simon Bolivar Buckner, former commandant, killed in action on Okinawa in 1945. This area is near the western boundary of the Military Academy reservation, in the midst of the heavily wooded, beautiful, and historically famous central Hudson Highlands wherein much of the action of the early stages of the American Revolution occurred. Camp Buckner is constructed on the eastern shore of Lake Popolopen near the Forest of Dean,

site of some of America's earliest iron mines. The camp, composed of typical Army barracks capable of housing a thousand men, a mess hall, and the other administrative, supply and recreation buildings characteristic of Army posts, spreads along the lake shore for two-thirds of a mile with all buildings within two hundred yards of the water. Located about the camp are numerous training areas and ranges designed to aid in the third class summer training program which is conducted each summer at Camp Buckner.

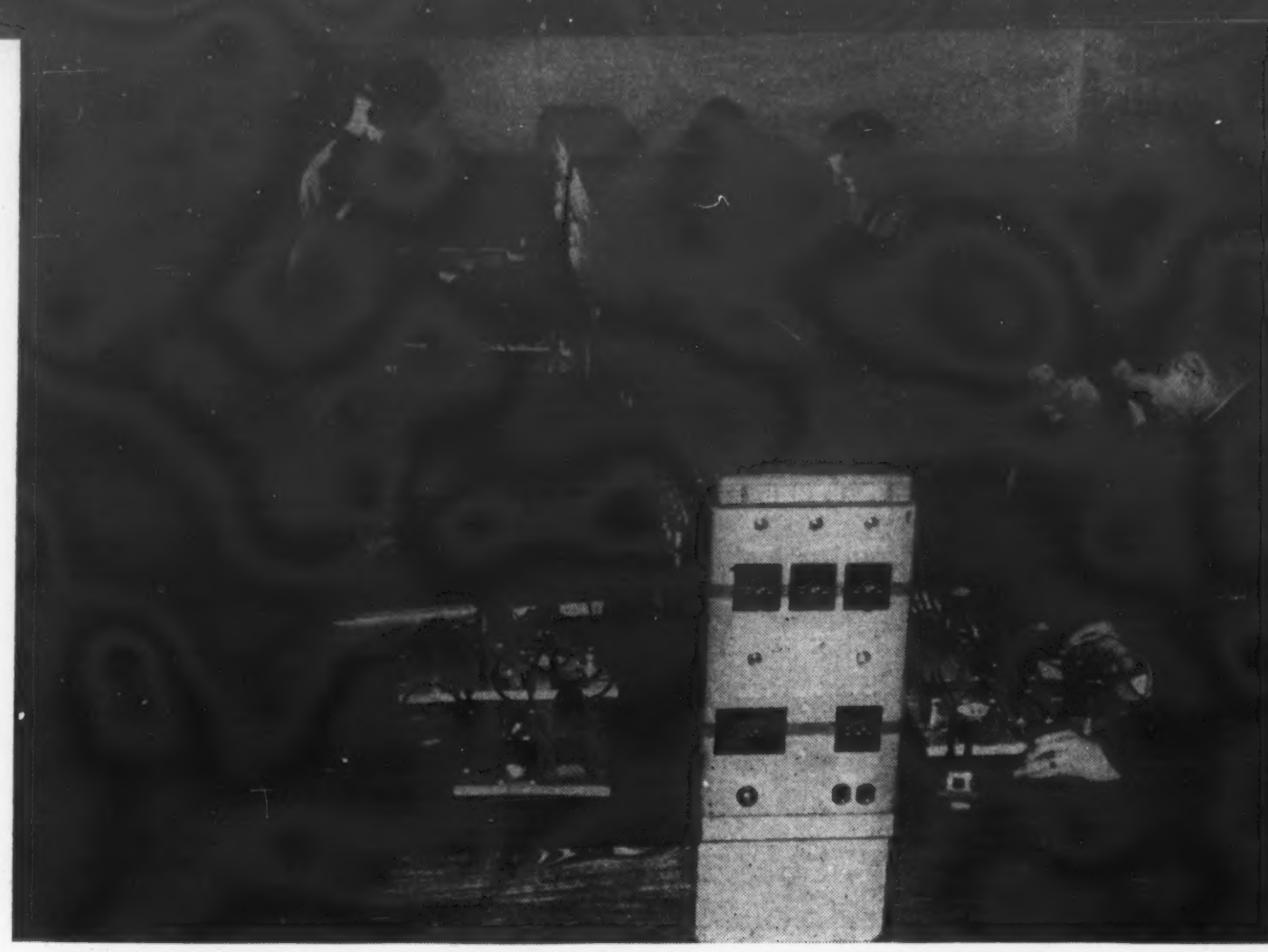
Training At Buckner

Early in July of each year the camp is opened with the return of the third classmen, usually between six and eight hundred cadets, from June leave; and during July and August the third class lives at Camp Buckner undergoing an integrated training schedule that has been devised to fulfill the primary purpose of the camp: to give the new third classmen, after the initial year at the Academy, a broad view of the functions and operations of the various combat and service branches. But the camp has two other missions: to allow the new third classmen to gain experience in command and troop leading and to allow the first classmen to gain experience in military instructing and in discharge of the duties of a junior officer. These three missions dictate the training to be given, the organization of the camp, and the method of instruction to be used.

The actual training is composed of armored force, artillery, command post, motor transportation, practical military engineering, quartermaster operations and signal communications exercises. Problems in platoon in the attack and use of weapons are supervised by the first classmen. Physical education, military courtesy and discipline, leadership, interior guard duty, orientation lectures and administrative details round out the training schedule.

The armored training consists of familiarization with characteristics of armored vehicles, tank driving, fundamentals of tank gunnery, introduction to tank communications, principles of employment of mechanized cavalry on reconnaissance and security and attack missions (platoon level).

The field artillery course deals with organization and operation of 105mm howitzer battalion, duties of liaison and forward observation sections, introduction to gunnery, range bracketing, firing demonstration to include: adjustment and fire for effect, prearranged fires, time on target technique, and firing of 4.5" rocket. The antiaircraft artillery course includes nomenclature and fundamentals of operation of 40mm gun, M5A1 director and M55 quadruple mounted machine gun, nomenclature and fundamentals of operation of 90mm gun, orientation on Radar 584, searchlight and control station, and Army-Navy transportable lights instruction.



Electricity laboratory.

In The Field

Field exercises involving the rifle squad in attack, in defense and on security missions to include receipt and issuance of orders, troop leading and actions by squad leader under various conditions are included in the training as is a platoon-in-attack problem consisting of organization of rifle platoon, demonstration of platoon in attack to include orders, reconnaissance, approach march, troop leading in the attack and consolidation on objective.

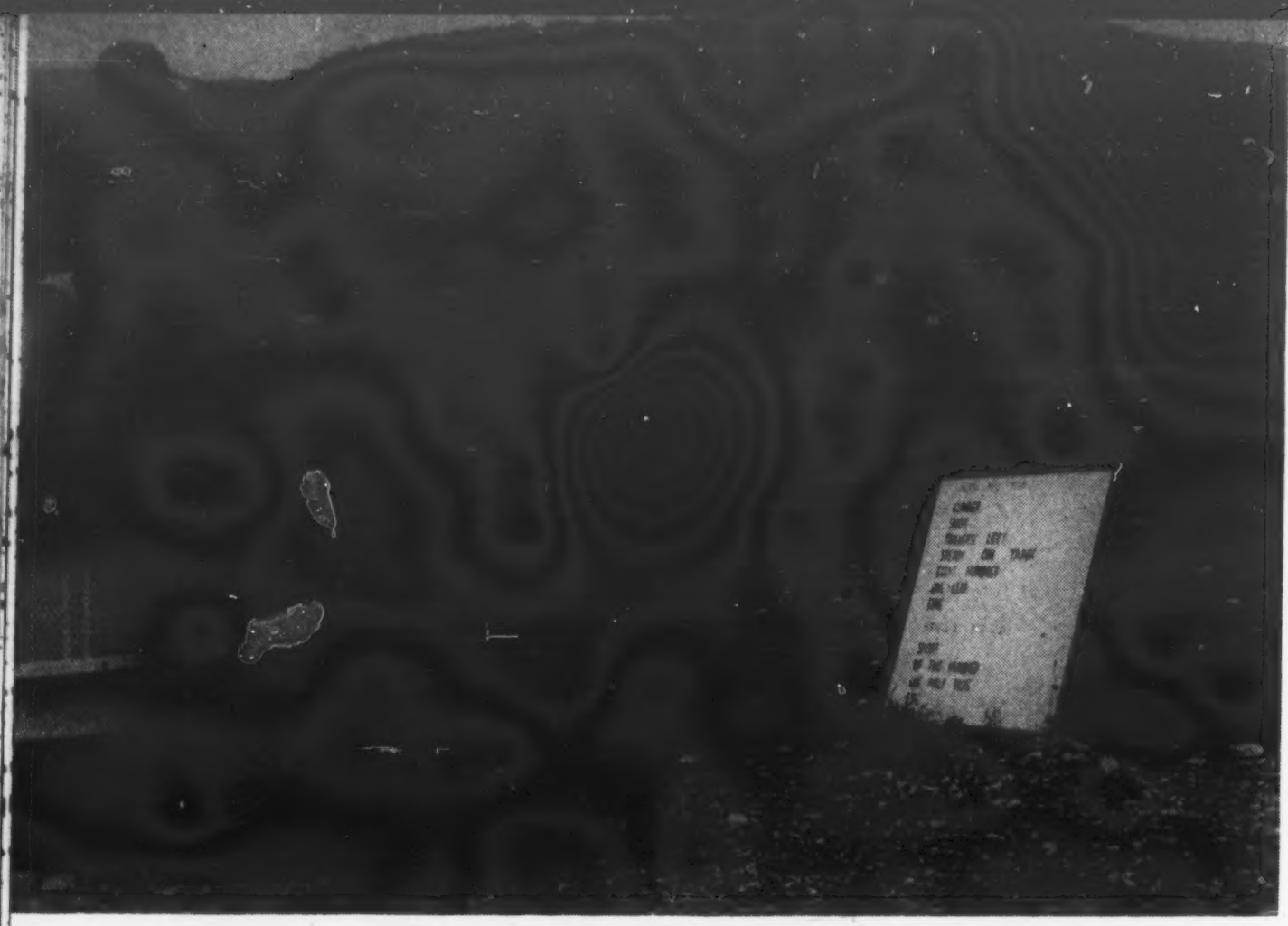
Service Forces training includes practical military engineering wherein the third classmen gain a knowledge of mines, operation of engineer mechanical equipment, road construction, footbridge, M-2 and M-4 bridges, Bailey bridge, and assault river crossings.

Quartermaster operations include organization, equipment and operation of Quartermaster units to include: bakery company, refrigeration units, fumigation and bath company, mobile laundry, gasoline supply company and salvage and repair company.

The signal communications training includes a command post demonstration of typical command posts of elements comprising a "type combat team" as well as introduction to signal communications, basic radio and wire communication, message center operation and procedure, message writing, and field cryptography.

The weapons course consists of instruction in the rifle, cal. .30 M1 (preliminary rifle marksmanship, instruction practice and firing course B for qualification), mortars (demonstration firing of 60 and 81 mm mortars), technique of fire (range estimation, target designation, fire order, application of fire and landscape target firing), and preliminary marksmanship and familiarization firing of the carbine, pistol, auto rifle cal. 30 and light machine gun.

All of this instruction is given by a group of first classmen, tactical officers from West Point, officers from the academic departments and officers and men from the various detachments of the 1802nd Special Regiment, school troops at USMA. In order to give the first class detail experience in instructing military subjects and in acting as junior officers, each first classman is attached to one of the detachments charged with a portion of the training at Camp Buckner. The first classmen spend part of their duty time preparing and presenting lessons to the third classmen, and during the rest of their duty time, they function as junior officers within the detachment to which they are attached, gaining experience as mess officers, transportation officers, and in other positions commonly assigned to junior officers.



Artillery range, Camp Buckner.

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Furthermore, the third classmen are organized into eight companies, each of which is commanded and administered by third classmen with one commissioned officer from the tactical department supervising the company. The cadets themselves are responsible for the conduct of the companies, and, since the eight companies are organized into a battalion which has a cadet staff, the third classmen gain valuable experience functioning as part of a battalion. The first classmen are organized into a ninth company, but since Camp Buckner is primarily a third class camp, the first class company is not part of the battalion and is in no way connected to the third class chain of command.

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The purpose of the Air Force trip is to acquaint the cadets with the capabilities and limitations of the various divisions of the Air Force so that they may be more cognizant of the role the Air Force plays in modern war.

Demonstrations, lectures and practical instruction are given on the capabilities, limitations, and tactics and technique of reconnaissance aviation, the tactical air control group in air-ground operations, bombing and strafing by fighter and fighter-bomber type planes, tactics and technique of pursuit aviation. Indoctrination in the organization and tactics and technique of strategic air power and demonstrative air support for Ground Forces by A-26 and F-80 planes are also presented.

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Of the whole second class summer the training at Fort Bragg is perhaps the most rigorous. Instruction in all phases of airborne training, such as loading planes with cargo and personnel, parachute packing, use of pathfinder equipment, and acting as jump masters in real paratroop flights is supplemented by lectures and a demonstration battalion airborne drop. Furthermore, all cadets are taken for glider rides to demonstrate the possibilities of that craft.

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The laboratory for basic electronics at the Military Academy, completed in 1945, is recognized as one of the nation's best. The laboratory itself is 64x72 feet and contains a main switchboard, a five channel radio frequency oscillator, and twelve laboratory benches with superstructures. Radio frequency is distributed to the 140 student stations by balanced lines.

The problems of supply and distribution of electrical power, of minimizing the amount of auxiliary power apparatus, and of providing audio and radio frequency signal sources and distribution systems have been solved by compromising flexibility, space, and economies into a common set of busses, switchboard bench groups, and control pedestals, all allowing simultaneous performance of different experiments and supervisory and overload protection to the entire system.

The switchboard contains five bays. In the fixed voltage bay there are the following source voltages: 115 v, AC, 60 cps, single phase, 225 amp; 208 v, AC, 60 cps, single phase, 150 amp; and 240 v, DC, 150 amp. The adjustable voltage bay contains two 120 v, 200 amp, storage battery banks tapped every four volts, and two 0-115 v, 60 cps, single phase variable transformers. The third bay is a simple transfer bay, followed by the fourth and fifth bays which are audio frequency and radio frequency bays, respectively.

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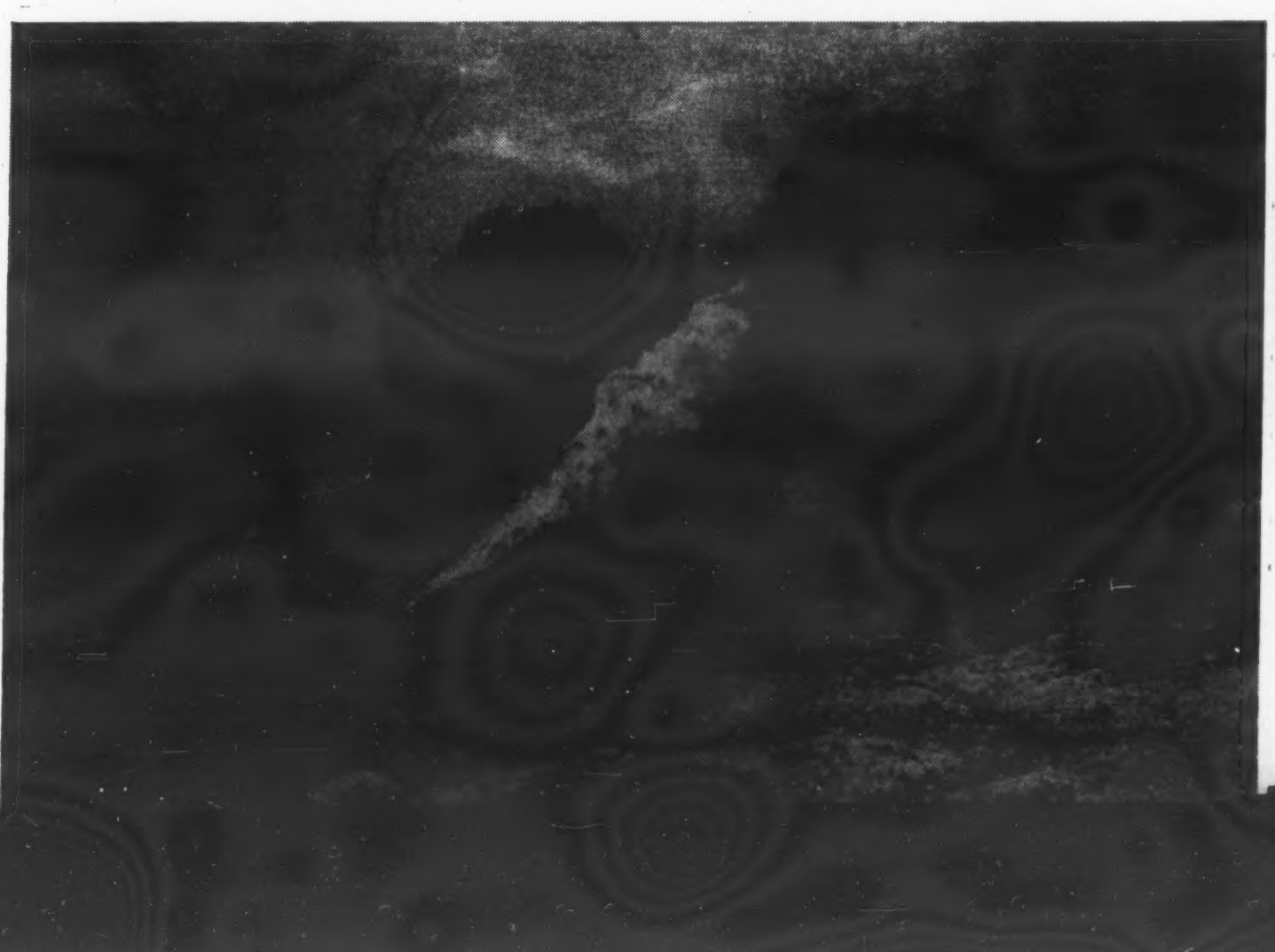
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Field exercises include training in [illegible] theory.





Simulated shipside in amphibious warfare training

the radio circuit. The course is arranged so that cadets obtain first in the classroom and then in the laboratory a cumulative working knowledge of each component of the transmitter and receiver. The climax of the radio phase of the electronics course is the laboratory period during which groups of cadets build a complete superheterodyne receiver to receive a broadcast from a transmitter built in the laboratory by the instructors.

Radar and Television

The brief amount of time remaining of the course is devoted to a rapid survey of radar and television. The radar survey covers the generation of special wave forms, such as the square wave and the saw-tooth wave, and a discussion of the basic theory of radar. The practical applications are demonstrated to the cadets. The demonstrations include some of the Army and Air Force's latest radar developments as well as the present standard equipment. The television orientation consists of a lecture which rapidly covers the history, developments and present trends in commercial and military television.

The electricity course is conducted in the same manner as are all the subjects at the Military Academy with a ratio of about sixteen cadets to each instructor. Each cadet recites and receives a grade at each attendance in electricity. This method of necessary self-study plus the individual instruction possible in class combine to insure the adequate presentation and the above-average absorption of the electrical subjects taught.

In the laboratory the same sixteen-man sections are maintained, thus allowing for closer instruction. Furthermore, the students' experiments are supplemented with demonstrations by the instructors to bring out features of the course not covered in class or by the cadets' experiments. At present about eighty per cent of the instructors in electricity have had graduate work in that subject. Throughout the entire electrical course military application of all theoretical material is made clear so that the cadets realize the importance of electronics in the Armed Forces today.

The final summer training program at West Point is in effect a summing up of the broad military education and constant instruction in leadership given to the cadets during their three previous years at the Academy.

In line with this summarizing objective is the first event on the calendar, the "Combined Arms" trip, taken by the entire first or senior class.

Electronics Tour Of Interest

It is interesting to note that perhaps the most constant phase of instruction connected with these tours was that concerning electronic research, development and equipment. At Wright Air Force Base electronic research is largely concentrated on about 130 navigation projects, concerned with allowing aircraft to fly regardless of weather. An interesting accomplishment of this type of experimentation is automatic flight, as tested by the Air Force's All-Weather Airline in a large C-54 airplane, making push-button flying and pre-selected destinations a reality. Work is being done on radio ground control approach systems for blind landings and radar of all kinds. At Fort Bliss the latest developments in gun-laying radar are shown to the cadets, illustrating nearly non-human control of large caliber antiaircraft artillery. Special radar equipment for tracking the rockets fired at White Sands is demonstrated to the class, as well as the electronic control systems in the missiles themselves. The Armored School at Fort Knox stresses the importance of radio equipment, training and research, since radio nets of varying frequencies comprise the chief means of communication between tanks.

Highlights of the trip are the impressive low-flying demonstrations of late-model aircraft being tested at Wright Field, including the new XB-46 four-jet bomber capable of speeds close to 600 miles per hour; a display of amazingly accurate firing on radio-controlled target planes by antiaircraft artillery units at Fort Bliss; actual firing of a test rocket at White Sands; a live parachute jump by trainees of the Airborne Section of the Infantry School, Fort Benning; and a night firing demonstration by tanks from the Armored School at Fort Knox.

The "Combined Services" trip, involving first a tour of the New York Port of Embarkation, showing the complex organization, services and planning required to embark troops and equipment onto naval transports, takes place later in the summer. Then the cadets visit the Signal Corps Engineering Laboratories at Fort Monmouth, New Jersey, and witness the latest developments in radio, radar, and other means of communication. The third and last stop is the Philadelphia Quartermaster Depot where the cadets are shown the methods of uniform manufacture and the research and development sections. This tour rounds out a military training program devoted to the objective of giving the cadets a broad professional background and practical experience in leadership and command.

Such a well-integrated program as this is typical of the carefully designed curriculum at the United States Military Academy, devoted to the single purpose of turning out the best possible officer material to serve the nation in the Regular Army and Air Force.

RADIO COUNTER-MEASURES

By Colonel Frederick L. Moore

The application of radio counter-measures (RCM) in conjunction with heavy aerial bombardment attacks during World War II proved a very effective means of aerial defense. In a war of lightning retaliation (with atomic weapons, guided missiles, and 500 m.p.h. bombardment aircraft) such as we may expect World War III to be, RCM should be of even greater value.

The technical measures likely to be employed in the next war are in considerable contrast with those of World War II. The general tactics of warfare from 1941-1945 are not so much outmoded as will be the weapons which were then used. The emphasis is now on increased speed and range of aircraft. When these two characteristics are attained new developments in aerial weapons are necessary to offset them. The airplane becomes a more potent weapon. When the speed of the bombardment vehicle approaches a Mach number of 1.0, consideration should be given to the removal of all guns from the bomber, since the speed at which it is traveling makes interception by a piloted fighter almost an impossibility. With fast bombers a definite possibility, all means for opposing them are again being studied to determine ways of stopping the aerial attack. The outcome of such study results in a requirement for earlier warning of an attack, greater speed of the intercepting missile, continuous and positive control of the missile, target-seeking characteristics, and some means of detonating the missile at the proper distance from the target. The application of electronics appears so far to be the best solution to the problem of missile control and guidance. Radio control is instantaneous in action and can be adapted to exercise any type of control desired. This is where radio counter-measures will apply.

In World War II RCM followed a general pattern: Radio and technical intelligence would give details on the enemy's communications system; research and design specialists with top priority would then produce an electronic jammer or other means with which to counter or nullify his communications; these counter-measures would suddenly be applied in conjunction with a planned bombardment attack on the enemy; with RCM being successful in disrupting the enemy's defense against attack, he would change his method of communications and the cycle would begin over again.

Underlying this pattern of events and causing it to assume the form it did was the basic policy of our air attack against Germany and her allies. With the weapons of that day it was necessary to darken the skies over Europe with clouds of bombers carrying a maximum tonnage of explosives aimed at the war-making potential of the enemy nation. The pattern of aerial warfare of World War II defined the pattern of RCM. The bomber offensive was spread over a long period of time. And although RCM did prove of value in the reduction of bomber losses from enemy fighters and antiaircraft artillery, its use was required continuously with each offensive. Whenever the enemy shifted to other means of communication it meant that the protective effect of RCM was diminished. The end result was an electronics research battle with the trend being called by the Allies in their application of offensive RCM. The enemy was finally forced to neglect radio development for offense and to concentrate on defense.

The British were the first to employ RCM outside of the laboratory stage during World War II. The Battle of Britain lent a very effective impetus to all means of countering the German air attacks. Consideration was given by the British to the use of RCM early in 1941, but the country was on the defensive. It was a well founded view at the higher levels of command that to commence a jamming war, to which the enemy would reply in kind, would only result in serious damage to the home defenses, particularly the British night defense organization which was extremely vulnerable to radio jamming. It was not until the middle of 1942 that Britain had turned sufficiently to the offensive to enable RCM operations to begin in the British Bomber Command.

Since United States air operations were planned and coordinated with those of the British, RCM was likewise considered by the American staff. The resultant evaluation of the enemy's air warning system led to projects for RCM to neutralize or deceive the German radar early-warning and gun-laying system.

Behind the problems of tactical employment, however, lay the absolute requirement for accurate intelligence concerning the communications system employed by the enemy. It was only when this information had been compiled, digested, and analyzed in the light of contemplated operations, that an effective plan could be worked out.

After intelligence had collected sufficient information to work on, and electronics engineers had designed the jamming weapon which would be effective, the equipment to fulfill such a plan had to be built. And in this case speed was all important. The foe was continually redesigning old communications equipment to give greater effectiveness and reliability. In addition he was bringing out new types which utilized different principles of transmission and reception than were contemplated in our RCM plan. As a result "RCM" became to the radio equipment manufacturer a synonym for high priority projects —equipment built on a "forget-the-cost" scale, of limited numbers, and customs built with the emphasis on speed. Everything was geared to a pace to put the RCM equipment into operation before the enemy could change his current methods of defense against aerial bombardment. After the rush project equipment was installed in the aircraft and its effective use realized, the enemy would make a quick switch to different means of doing the same job, and the cycle of plan, design, construction, and utilization would be repeated.

In the application of RCM the entire enemy communications system must be scrutinized and the weakest link in the chain attacked. For instance, in the complex, radar-directed, fighter control system on the

Courtesy: Air University Quarterly.

continent, there were several points at which RCM was applied. When the enemy used medium-frequency voice radio from controller to pilot, it was possible to utilize very high power ground stations in Britain tuned to the same frequency. A German-speaking announcer would break in and override the actual German controller. In a carefully pitched voice an allied announcer would give the night fighter pilots conflicting orders. This threw the night fighter control system into a state of turmoil. By this simple method of RCM many pilots were led to airdromes closed in by weather conditions or confused to the extent that extra delay was caused in obtaining correct directions from their own controller. This resulted in heavy attrition of aircraft, complications in assembling aircraft for the defense the next day, and, above all, a decided lowering in morale of the air crews.

When the Germans changed to very-high-frequency radio for ground-to-air communications it was still possible to cause nearly the same confusion by airborne jammers broadcasting random noises or a wobbly tone ("bagpipes"), or by having a radio operator in the aircraft call out false instructions in the German language.

"Window" was a method of blindfolding the enemy radar operator. Window itself was nothing more than thousands of pieces of tinfoil ribbon cut to a precisely calculated length to give maximum response in the enemy radar scope. When dispensed from pathfinder ships it effectively blanked out the radar presentation received from that area with the result that after the initial drop of the window along the bomber stream path, individual formations could no longer be "seen" in the window path. As a result, fighter controllers could not see to direct their fighters to an interception. With the aid of window, decoys and feints of simulated large formations could be run with few aircraft, thereby increasing the weight of effort available for the main attack.

Of course these were not the only RCM measures used. There were many more and they all served to complicate the communications and warning systems of the enemy. The most important result was that losses suffered by our own formations were substantially reduced. Without the benefit of RCM the losses would have been prohibitive in some cases.

The effective use of RCM in the American air offensive is also indisputable.

The operational use of counter-measures equipment involved some of the most extraordinary duels of wit in the history of war, and it helped mightily to speed the day of victory. It has been estimated that radar counter-measures saved the U. S. Strategic Air Force based on England alone 450 planes and 4,500 casualties. But that is only part of the story. They played a major part in the masterly deception which covered our landings in Normandy and in Southern France. By blinding the eyes of our enemies while permitting our our radars to scan with little or no interruption they struck from the hands of the Germans and Japanese new and potent weapons, while leaving us free to do our utmost.[1]

A second important result of RCM during World War II was the strain it imposed on the enemy's radio research and production organization. Every successful RCM effort had to be countered by the enemy in order to restore his defense. Many RCM devices—in particular those against radar—involved the Germans in the design and quantity production of new or modified equipment. Evidence now shows that while there were delays in design and production on this side, similar difficulties were much more serious in the German Air Force which suffered far more than did the Allies. The German radio industry, though fully mobilized and completely under government control, was faced throughout the war with demands which became more and more difficult to meet. Many of these demands were the direct result of the RCM campaign. This meant that the radio industry, with the research organization behind it, was forced to neglect radio development for offense and concentrate on defense. Their greatest problem in this connection was countering the RCM program.

Another unseen dividend from RCM was its capacity for lowering the morale of the operational personnel of the enemy night defense system. Here the effect on the flying crews was most serious, since the target of many radio counter-measures was the radio link between the fighters and ground control. For the most part this was effective, the enemy soon being brought to the point where he had to rely on a handful of "ace" crews for his results.

For the employment of RCM in aerial operations there are certain prerequisites for successful application. The one requirement that has been consistently emphasized more than any other is the absolute necessity for a steady flow of high-grade technical intelligence. Every means available must be used to ascertain the new developments brought forth by the enemy. Continuous evaluation and research must be carried on to anticipate the application of new discoveries made by our foe if the advantage gained by intelligence is to be exploited. Such superior intelligence is extremely hard to obtain and the lack of it has been the norm.

Another important prerequisite is the requirement for trained personnel to operate the RCM devices. The Word War II technique of a microphone strapped against the fire wall of an aircraft, with the radio operator tuning the liaison transmitter to the high-frequency control channel of the enemy interceptor, belongs in the past. Other nations now use much equipment similar to ours on the ultra-high-frequency bands. A radio operator qualified to adjust his jammers to the best advantage and make proper changes in the equipment in flight cannot get the necessary training by attending a special school between the time of attack on this country and a retaliation mission take-off. During World War II it required six months to train alert draftees to become the most elementary aerial radio operators. Personnel qualified to perform modern RCM duties while in flight will require specialization and considerable schooling long before they can be used on a bombardment mission.

In summary, the major requirements for successful RCM will include all the intelligence we can gain; the proper type RCM equipment with which to do the job, installed and ready to go; and trained personnel who fully understand their duties and the most effective means of applying RCM.

Up to this point we have touched only briefly on the type of warfare that we may expect in the future. With the use of atomic weapons, the mass bombing raids of World War II must be a thing of the past. Whatever the size of future bomber formations carrying atomic bombs, they will never equal the size or frequency of strategic bombardment raids as we have known them. Future formations carrying atomic bombs might well contain about sixteen aircraft. We can expect such aircraft to be extremely fast. Speeds up to 450-500 m.p.h. should be obtained for short intervals, with cruising speeds of 300-350 m.p.h. In short, whatever the type of bomber, it is certain to be faster.

Air warning and control systems experienced many difficulties during World War II in making lethal contact with the aircraft. When anti-aircraft was successful in destroying more than ten per cent of the attack-

[1]James Phinney Baxter, III, *Scientists Against Time* (Little, Brown, 1946).

ing force its part of the air defense was considered effective, because when that figure was reached no air force could maintain large scale attacks.[2] This ten per cent was attained by using radar early-warning and radar gun-laying sets. Incoming aircraft did not exceed an average speed of 240 m.p.h.

Now consider the problem of downing the 500 m.p.h. bomber. Work is being done on improved methods of antiaircraft gun-laying. Radar controlled guided missiles are being designed to have the speed and range necessary to intercept the incoming bomber. Target-seeking heads for guided missiles are being considered. And as always we have a requirement for a proximity fuze.

But visualize the means of control available to guide the missile to a successful ground-to-air interception. The only means of control which so far has been considered practicable is by *radio waves* in some form. There are many variations in the methods of radio control, but regardless of the method there must exist on the ground a transmitter which sends out a signal in some distinct form. The receiver in the guided missile receives a certain coded pulse, which moves the control mechanism causing the missile to change course. It is in this link-up between ground and air that RCM can play a definite part. Whenever a radio receiver is accepting a radio wave it is also possible for a second radio wave to enter the receiver and either confuse or obliterate the desired signal. These jamming waves could be sent from a bomber in flight. The control pulses from the ground station would then be confused or interfered with to the extent necessary to cause an appreciable error in the trajectory of the missile. With the high speed of the bomber only a slight deviation is necessary to cause a miss.

In the case of defense against a piloted high speed interceptor we have a slightly different problem. This type of attack will have several communications links to which RCM can be applied. The pilot will receive instructions from the ground controller on course changes and altitudes at which to fly. We may expect an airborne radar set to be installed in the aircraft which will enable the pilot to "see" his target while still at some distance from it. But each communication link is susceptible to RCM.

Early-warning radar using centimetric wave lengths was in operational use in 1945. This type of equipment provides a certain amount of immunity to RCM. But the point remains that since its application is new it has not been fully tested for RCM. RCM in the form of airborne jammers and window was effective in World War II. Even though it may be more difficult to design and construct a jammer for centimetric radar with its narrow beam width, should not our design efforts keep pace with the increased destructiveness of the weapon we will employ?

Military men are acquainted with the tremendous problem of training the personnel to operate an aircraft warning and control system. The efficient operation of such units does not blossom out after only two or three months' training and operating. It requires a considerably longer time to whip into shape an efficient and dependable organzation. It is also definitely recognized that until such units have received their first taste of battle their overall efficiency is comparatively poor. This condition should operate to our advantage in the control and warning system of the enemy country.

For the use of RCM as a means of defense in strategic aircraft, four factors must be kept in mind:

1. Bombers are likely to have a ground speed of about 500 m.p.h. and will fly at 30,000 feet or above.
2. Formations will contain few aircraft. No longer will the mass raid attack be employed. The destructive power of the atomic bomb will make this unnecessary.
3. Bomber raids will be concentrated over a relatively short period of time, perhaps not more than three months, at which time the war will have been decided one way or the other.
4. There will be a definite lag in the air warning and defense control system. It takes time to identify the target as enemy or friendly and to dispatch a missile or interceptor to ward off the attack. There is a *decreasing* amount of time available for interception as the speed of the target increases.

Any nation's bombers making use of the above factors would be difficult to stop. Since these characteristics are potentially realizable many nations are expending a great deal of research and development effort on means to intercept and destroy the attacking aircraft.

Once hostilities have begun and our retaliatory striking force is on its way, we will find a small hard-hitting bomber formation of several aircraft identical in appearance. But a few of these aircraft will be completely equipped with the latest design electronic jammers, with equipment of sufficient power to confuse and bewilder the unseasoned enemy radarscope operator. The jamming equipment should cover almost the entire radio frequency spectrum known to be used by the hostile nation. The guided missiles of the enemy will be confused by the strong radio signals coming from the formation. Their proximity fuzes will be detonated before their missiles arrive close enough to do us damage. The speed of our formation, together with the interference of the jammers, will so reduce the time available to the enemy air warning and control system that their interceptor fighters will have difficulty in making contact with our formation. Even this controlled interception will be made more difficult by jamming the ground-to-air fighter control channel. Robbed of some of his defense measures while others are reduced in effectiveness, the enemy will have difficulty in warding off our attack. The speed of our bombers, in a small formation, will add further complications to his already harrassed defense. With the present destructive capabilities of only a few aircraft the enemy will be seriously hurt, since a high percentage of bombers will reach their objective.

Thus, electronics design is progressing rapidly toward more complex, higher powered equipment, and to the higher frequencies where it is easier to focus radio waves and attain the equivalent of higher power. To sucessfully jam newer equipment and to interfere with the exchange of intelligence between two parties, is a difficult task. To this is added the everlasting need for technical intelligence, complete and recent enough to enable RCM apparatus to be designed and built. Effort must be put into the RCM program now if we are to have, in being, the equipment and trained operators ready to do their job. When this task has been accomplished the enemy will find his guided missiles rendered incapable of the mission for which they were designed. With few bombs required to obliterate any target, we should take every possible step to insure that the bomb-carrying vehicle reaches the bomb release line. It would be far less costly to do the research and equipping for RCM now than to lose a few vital aircraft short of the target if war should come.

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[2] E. M. Friedwald, *Man's Last Choice* (Viking, 1948).

SIGNAL WAC

By Lt. Mary O. Kennedy

The invasion of continental Europe was just past its first month and the assault troops still only a few miles inland when the first forward echelon of Wacs were landed on the Normandy beach. That little band of 54 women constituted the advance party of the 3341st Signal Service Battalion in the U. S. Army.

It was highly appropriate that Signal Wacs should be the first to reach Normandy, for the Signal Corps was the first U. S. military service to recognize the value and potentialities of women in military service.

During World War I 225 American women, who could speak French, operated switchboards at signal centers in France. They had no military status and had none of the Army benefits. Housing and physical well-being were their own responsibility. Yet, despite these handicaps, they acquitted themselves creditably.

After the war these women returned to their normal occupations and lost their identity as a group whose contribution to the Army had been an important part of war activities. The communications duties of the Army reverted to an all male status.

In 1942, the manpower demands of World War II gave women their first real opportunity for patriotic service. The Women's Army Auxiliary Corps was established, an event the like of which was unprecedented in the military history of the United States. In its inauguration the potential usefulness of women was recognized. And the Chief Signal Officer was one of the first chiefs of Service to contact WAC headquarters to request Wacs for duty.

At first only those women with previous experience were assigned to this type of work. However, so successful were women at replacing men in certain specialized duties that within a few months Wacs throughout the country were being sent to communications schools. These women were selected on the basis of their Army classification and aptitude tests. They were carefully screened. Teletypists, telegraphers, radio operators and repairmen, and photographers, were soon in training, working side by side with the men. The ease with which women grasped the intricacies of this highly technical work amazed the instructors.

In January 1943, the first members of this women's military corps landed in Africa. Bilingual telephone operators were in the group handling calls in French and Spanish as well as English. Much of the success of the Tunisian campaign was credited to the skill and dexterity of this group. This was the beginning of the supreme test on utilization of women in combat areas. It resulted in their assignment in every theater of operations where the Army itself was serving. Soon in all the theaters female fingers were tapping out telegraphic and teletype messages and feminine voices were heard at switchboards. Women also were entering the radio and photographic fields.

In September 1943, when President Roosevelt and other American statesmen met with Prime Minister Churchill in Quebec, Wacs were selected to act as telephone operators and security mail clerks. Again at the Cairo Conference in December 1943, and the Potsdam Conference, July 1945, Wacs were assigned to these duties. At all of these history making events the women displayed their competence and versatility.

Working around the clock in eight-hour shifts, the Wacs of the War Department Signal Center shared the responsibility for the operation of the Army's vast wire, radio and cable communications system. Through the Wac's hands passed the messages destined to change the course of battle, to bring reinforcements to the front lines, to send desperately needed supplies.

By 1945 the WAC had attained its peak strength of approximately 100,000 women. The skepticism which had greeted their advent into the military had been replaced by respect and admiration; doubt gave way to confidence and an earnest desire for more women in technical jobs. Recruiting campaigns were organized to augment the WAC ranks.

With the cessation of hostilities most of the members of the Women's Army Corps followed the trend of the times and headed homeward. The Signal Corps saw many of its most highly qualified women technicians return to civil life and enter the civilian communications field.

Throughout the Army the situation was the same. The need for a regular reservoir of women personnel in the Armed Forces was now generally recognized. The chiefs of all the services enthusiastically submitted statistics and studies concerning the need for this permanent women's organization.

The Department of the Army had four major reasons for requesting a permanent Women's Army Corps. They were:

1. To maintain the nucleus of a corps which would be ready for expansion in case of emergency.
2. To find out how and where women can best be used before that emergency arises.
3. To provide for the more eco-

Wac teletype operator checking tapes in communication center.



nomical use of all personnel by using women in jobs for which they are better suited than men.

4. To assist in keeping the Army on a volunteer basis by filling certain recruiting shortages with women.

To insure a slow, steady growth of the Corps, an initial authorization was set for the first two years at 500 officers, 75 warrant officers, and 7,500 enlisted women. At the end of that period legislation has set at two per cent of the Army strength the number of women who may serve at any one time.

These limitations will support the Army's policy of quality of personnel. Selectivity will be the keynote of the program. Great care and consideration will be given to classification and training. Women are not now being selected for temporary emergency needs, but for a permanent corps of potential leaders.

Again the Signal Corps, as in the last two world conflicts, leads the field in its plans for the utilization of Wacs. The Corps made a detailed investigation of the possibilities for enlarging the sphere of activities where women could be used. Some amazing facts were unearthed by this research. The scope was unlimited! Wacs could work in nearly every field of endeavor—in nearly every job which the Signal Corps had to fill. There were few limitations such as duty with combat units and jobs involving the handling of heavy equipment. In many instances it would be possible to man entire units with Wacs!

The aim of the Army is to make National Defense a new career field for women. Within the Signal Corps the opportunities for that career abound.

AIR FORCE WAC

Material Prepared by Air Force Public Information Office

When Colonel Geraldine P. May* was visiting Nome, Alaska, in June 1945, a young sergeant stopped her with a plea. He said he had been in Memphis in 1943 when Wacs arrived there. Resultantly he had been ordered from Memphis to White Horse, Alaska, that year. After he had been at White Horse a few months, Col. May appeared there to inspect facilities. As a result of her report Wacs were sent to replace some soldiers at White Horse, and he was ordered to Nome, "Now you're in Nome," he said to Col. May. "Won't you please go home, ma'am? I don't want to go to Siberia."

The sergeant's remarks graphically illustrated the advance made by the Wacs in two short years in the Army Air Corps.

The Women's Army Auxiliary Corps was established in May 1942 after more than 20 years' discussion on the floor of Congress and in military circles concerning the need for such a service. With its establishment in World War II women finally gained the opportunity to serve their country during a national emergency.

Within a month after Pearl Harbor the Air Corps asked Congress to give them part of the proposed women's corps. On September 20th, 1942 the first members of the WAAC to serve with the Air Corps arrived at the Aircraft Warning Service Station at Albany, New York. Women who had been doing volunteer work with the AWS were recruited in the WAAC with the promise that they would be returned to their home communities for AWS duties. After basic training at the WAAC center at Des Moines they were returned to resume their old jobs as plotters or filterers at Aircraft Warning boards.

About a year later when the danger to the East Coast lessened, it was decided to man the AWS with civilians. Most of the Waacs, although given a chance to resign, remained in the service. Many of these 3,000 women had never been outside their home state except for the period at Des Moines. All had joined the WAAC in the belief that their entire war service would be spent in their home town. The disintegration of the AWS units and the parting from friends with whom they had joined, trained and served, the uncertain waiting period before receiving new assignments, the necessity for deciding to stay in or to get out—all these problems would have tested the moral fibre of the most experienced soldier.

Those who did stay in had again to decide whether to stay on active duty or not in August 1943 when the WAAC was made a component of the Army (Women's Army Corps) rather than an auxiliary. For some of the former AWS women the decision had to be made a third time in the European Theater after VE-Day in connection with returning to the States for discharge on points or remaining in the Army until the final end of the war. In effect, these women decided to join the Army voluntarily four separate and distinct times in one war. Three of their decisions were made after they knew everything there was to know about the regimentation of military life.

Though the idea of military training for women had been discussed sporadically by the Army since the 1st World War, no actual standards or plans for their recruiting, training, housing or utilization existed when the Corps was established. The trial and error method was used to solve the unique problems of a feminine

*Colonel May was WAC staff director for the Air Transport Command during the war. She is now the Director of the WAF, Women in the Air Force.

Wac radio operators aboard an Army hospital ship, WW II.



military group: civilian and military prejudice against the idea, recruiting difficulties because women thought if they were really needed they would have been drafted, the belief of the general public that women in the armed forces were to be used mainly as cooks and waitresses, and the lack of housing for women, which caused recruits to pile up in the training centers.

In March 1943, fifty-seven WAC "enrolled women" and two officers, arrived at Jefferson Barracks, Missouri, to work for the AAF's Map Chart Division, and the AAF's first two WAC post hearquarters' companies arrived at Chanute and Scott Fields. By the end of the summer Wacs were stationed at 171 air bases.

Early Undecided Status

The treatment accorded to women soldiers was usually based on one of two theories. The first theory considered all women, in or out of uniform, delicate creatures who must be shielded from the blows of the world. The second theory held that soldiers were soldiers, regardless of sex. Advocates of the first were confused as to the proper administration of women under military law. They could not believe that the War Department seriously intended women to be subject to military discipline. They forgot that women recruits were as much a cross section of American women as men inductees were of the male population, and that women are usually subject to the same control by courts of law and the police system as are men.

The "soldiers are soldiers" school of thought kept Wacs in cotton stockings six days a week even in the hottest weather, permitting them to wear rayon hose only on Sundays. They put Wacs over soldiers' obstacle courses until someone broke an ankle and the War Department forbade such physical training. Women on clerical assignments during the day were required to drill the same number of hours as men and sandwich in their own housekeeping and maintenance of messes in addition to doing personal laundry. A sixteen hour day was the result.

A serious public relations problem developed from the eagerness of some commanding officers to qualify their WAC units in the use of arms. People who doubted the real necessity of using women in the military services were quick to pounce on any picture of a woman in uniform aiming a pistol or rifle and say, "Look, What did I tell you? They're going to make those women fight!" Or, "Look! What did I tell you? Those women haven't got a thing to do but play around with guns! The Army doesn't need 'em!"

To Arm Or Not To Arm

The War Department issued memorandums on the subject ranging from a flat refusal to permit any woman to carry, use or be trained in the use of arms to one which permitted such training for those few women who were assigned to jobs which might require the carrying of arms, such as carrying the payroll to isolated units. The first memo, issued in the summer of 1943, was so sweeping that a field unit telephoned to AAF headquarters to check whether they could continue to use a Wac to instruct student aircrew members in bombing accuracy by aiming a gun which shot a ray of light at a moving picture screen.

The Air Force was so enthusiastic about using women in flying assignments that a WAC officer asked if there were a ruling under which she could prohibit the use of a woman radio operator on training flights when members of the crew practiced bombing and repulsed practice aerial attacks. The principal objector to discontinuing this particular practice turned out to be the Wac taking part in the flights. An order was issued in November 1943 stating that Wacs would not be placed on flying duties with combat units or in aircraft used for combat training. However, Wacs served as radio operators, crew-members or flight traffic clerks on non-combat airplanes.

Clothing and housing problems were acute. Clothing was so scarce that several Wacs completed six weeks of basic training and went into the field in civilian dress. One Wac reported to an air base on the west coast as the first woman soldier in that area in the bedraggled dress which she had left after sending home most of her civilian clothing from the training center. The training center had been unable to outfit her and a special telephone call from the Office of the Quartermaster General in Washington to a midwest supply depot was necessary before she received any uniforms. Women recruits met the same unfeeling supply sergeants on the clothing issue line as did men, ending up with the wrong size as frequently as soldiers.

Housing plans were behind schedule and many buildings were still being built or converted when Wacs arrived. Staff directors found it necessary to explain more than once why Wacs needed beauty parlors (their barbershop equivalent), why fireladders had to be changed to fire stairs or why individual messes and day rooms were essential as focal points for group activities. Most base commanders were amenable to the extras which Wacs devised for their day rooms and barracks (window shades were a necessity) but were limited in alterations by wartime shortages.

The mechanics of assignment was a major WAC stumbling block for some time. Insofar as their housekeeping went, Wacs had to be administered separately; insofar as their jobs went they had to be administered as part of the unit performing a job. The troubles which arose concerning the requisitioning and assigning of WAC personnel came from regarding them as a special type of personnel which had to be considered apart from all other types.

Increased Demand For Wacs

Air Force demand for WACs always exceeded the supply. Troop Carrier Command asked for a laundry company and was told WACs were not used on such basic assignments because they would be replacing civilians instead of soldiers, and the adverse effect upon recruiting that such assignments might have. WAC medical companies were asked for but were not available. Tinker Field asked for five WAC graduates of the Army Finance School but there were none. The Eastern Flying Training Command wanted to enroll WACs in the Military Government School in Virginia but was unsuccessful. WACs could not take part in soldier shows put on by the AAF branch of Army Emergency Relief because of the fear that the public might think the Army had no real need for women in uniform, although men took part in the performances without fear of public disapproval.

The bottom of the manpower barrel was being reached so far as men capable of armed combat were concerned. The supply of men capable of limited service was exhausted.[1] Therefore the chance to substitute women for men in behind-the-lines jobs in combat zones and in the zone of interior was seized upon by all military men as news of the Wacs spread far and wide. Of the more

[1]Gen. Jacob L. Devers, Commanding General, Army Ground Forces, before House of Representatives Sub-Committee hearings on S.1641.



Weather observation—Wac at theodolite tracks balloon while other transmits data to plotting room.

than 628 Army specialist jobs filled by enlisted men, over 239 were filled by Wacs by the end of the war.

The Wacs were first enrolled for four specific jobs—cook, driver, clerk and telephone operator. In less than a year the Air Force listed 155 jobs to which Wacs were assigned. They proved themselves so useful in most cases that the requests for Wacs from field units were more numerous than had been anticipated or could be filled by voluntary enlistments. Although Wacs overseas were not assigned below the division level, wings and even groups, wanted them on their staff. Every job the Wacs tackled was done with the traditional neatness and dispatch of good soldiers.

It is common knowledge that women handle secretarial or stenographic work better than men, but even WAC staff directors were pleasantly surprised at the record achieved by Wacs working alongside of men. One job classification after another was opened to women as their adaptability, neatness, accuracy, conscientiousness, and unflagging endurance (the hospitalization rate of Wacs was no higher than that of men and sick call attendance decreased as they moved nearer the front) became known. WAC records show that every commanding officer, with very few exceptions, who had Wacs on his staff recognized their ability by asking for more on the grounds of superior efficiency.

When President Roosevelt went to Quebec to confer with Winston Churchill in September 1943, 29 WACs were selected to act as telephone operators and security mail clerks. They started work the first day in the afternoon and were still on the job the next day despite the fact that they were given only an hour's rest. During the first four days telephone operators averaged 18 hours a day on duty. When a few secretaries were needed in a hurry, some of the Wacs were pressed into service. Each Wac received an official commendation for the superior manner in which she had performed her duties.

Tech Schools Open To Wacs

One technical school after another in the Army and Air Force Training Division opened its doors to Wacs. They were graduated as photolithographers, cryptographers (they were better than men at this), pneumatic riveters, geodetic computers, purchasing agents, radar operators, armorers, structural steel workers, hand and shoulder weapons' mechanics, and topographic draftsmen. Some, without previous hospital training, became medical, surgical, dental, laboratory or X-ray technicians. They met the same qualifications for entrance into technical schools as enlisted men.

The Command and General Staff School at Fort Leavenworth enrolled its first WAC officers in February 1943. Students learned how to assist the commanding general of large Air Force and Army organizations in solving personnel, intelligence, operations and training, and supply and maintenance problems. Men and women attended the same nine weeks general staff class and one Air Force WAC graduated fourth in a class of more than 1,000.

Wacs selected for training in radio skills were sent to the Midland Radio and Television School at Kansas City, Missouri, the United Radio and Television Institute, Newark, New Jersey, or the Keystone Schools, Inc., Hollidaysburg, Pennsylvania. Women and men soldiers worked together on benches tearing down radios, learning to wind coils, take voltage readings, splice wires, analyze circuits, and send and receive coded messages. Their instructors admitted to amazement at the ease with which women became accustomed to the intricacies of building and repairing radio sets.

A score of 100 on the AGCT and 100 on the radio-telegraph operator aptitude test was necessary for enrollment in the operator's course. Prospective radio repairmen had to pass the AGCT with a score of 110 and a mechanical aptitude test with

a score of Army grade 3. Graduates of these schools, along with Wacs with previous civilian training, filled one of 15 radio and electrical MOS's.

Other Wacs were trained as instructors in synthetic gunnery or Link trainers. After a course in the theory of fixed and flexible gunnery, they attended a concentrated familiarization session given by the manufacturers of the synthetic devices. They were taught how to hit, the importance of lead, range estimation in bringing down an enemy target, and tracking. As instructors they operated the trainers which approximated actual combat conditions. They directed an image of an enemy plane on a screen, and the student fired his "gun" at the plane, which flashed red as if bursting into flame when he scored a hit. They also operated motion picture, slide film, and third dimensional projectors for training purposes.

Teaching Experience Value

Wacs made good Link trainer instructors because many of them had had previous experience teaching school. They gave directions to aviation cadets inside the hooded cockpit of a training device while sitting at a control desk. The cadet, "flying" entirely by instruments, followed a hypothetical flight plan. His progress was recorded by a wheeled instrument on a chart in front of the instructor. The Wac gave directions to the student through a microphone and pointed out mistakes when he finished.

The AAF's Chaplain Transition School in Texas enrolled Wacs every two weeks. Choir direction, organization of clubs for the study of religious subjects, and procedures peculiar to each method of worship were covered. As future chaplains' assistants they were expected to be stenographers and clerks, to have the tact and poise necessary to act as receptionists, to know how to prepare the altar for church services, and be enough of a musician to play the organ or direct the choir. They were encouraged to teach Sunday School classes, care for flowers for the church provided by voluntary civilian contributions, and to visit Army hospitals in their off-duty time.

Wacs who received training as weather observers were assigned to units of the Air Weather Service. They made local weather maps from coded reports on the teletype circuit. They sent up pilot balloons, plotted their course with a theodolite, and sent out hourly coded weather reports on the teletype from readings on other standard weather instruments. They were given on-the-job training in the operation of fascimile and wirephoto machines. They corrected the manual of operations which contained hourly reports on world wide weather information. Weather forecasters analyzed weather data to predict the weather at their stations and at other bases.

Wacs in the Air Transport Command were responsible for the in-flight feeding kitchens which prepared food for ATC passengers and crew. An in-flight kitchen in Miami was more than $800 in debt when a Wac took over its operation. She liquidated the debt in two months by serving appetizing sandwiches.

Wacs were frequently considered better control tower operators than men. They gave landing and take-off directions to the pilot through a hand microphone. If the pilot could not be reached by radio, they signaled to him by pulling the trigger of a "biscuit gun," which blinked a red or green light, or by firing a flare from a Very pistol. Women's voices carried better than men's, and the resultant joshing between pilot and Wac boosted the pilot's morale. The pilots had complete confidence in Wacs' ability to talk them in.

Wacs Replace Waafs With 8th

When the Eighth Air Force went to England in 1942, British WAAF's (Women's Auxiliary Air Force) were detailed to assist them. In the summer of 1943 the British asked the Eighth to bring over their own help because every person in England, except the old and the very young, was needed to serve her country. Six hundred Wacs reached England in July 1943.

The WAAF's turned over their desks to the Wacs about a month after their arrival. The month was used to train the Americans at British schools, for they were listed as having only the four original WAC skills. Typists went to teleprinter classes and officers to code and cipher school. Telephone operators attended a week's course in the private wire system used by armies in the British Isles. They in turn taught United Kingdom procedure to the new arrivals in their section. American airmen had become accustomed to the high-pitched voices of British telephone operators, and they thought the comparatively low-pitched voices of American women were those of men at first.

The first women "watch officers," British or American, were Wacs attached to the Eighth. They were responsible for transmitting information concerning operations of bombers and fighters at the take-off, assembly, rendezvous, target, and landing points. The first time RAF officers called in to the watch officer and a woman's voice answered, they were sure the Americans were trying to fool them.

Flood Of Requests From 9th

With the activation of the Ninth Air Force in England, requests for Wacs began to inundate AAF headquarters. A WAC officer who commanded Wacs in the Ninth for two years said, "Anyone who heard, even remotely, about the jobs Wacs were handling, put in a requisition for them." Air Force Wacs served in England, North Africa, India, China, Italy, Egypt, Australia, Hawaii, New Guinea, Labrador, France, Guam, Netherlands East Indies, Gold Coast of Africa, Philippines, Bermula, Alaska, Canada, and other countries. The largest contingent of Air Force Wacs overseas, 3,000, served in the ETO.

One of the ace cards up the recruiting sleeve of the Wacs was their ability to go overseas in contrast to Waves, Spars and Women Marines who were denied such service except in United States' territories such as Hawaii. Wacs were assigned to such duty, with one difference, by the same procedure as men. Where men were trained and sent over as a squadron or group, women soldiers always went as individual replacements according to the requisition of the theater commander and their MOS. Ten typists, a weather observer, code clerk, cryptographer, three linguists, one expert stenographer, and an automobile parts clerk might go over in a group, but for assignment to widely scattered jobs.

Wacs filled a smaller number of jobs overseas than in the States but they took on some new ones peculiar to an actual theater of war. As photo-interpreters they looked at stack after stack of pictures of enemy territory and installations taken by bombers, fighters and reconnaissance aircraft before, during, and after bombing and strafing raids. Looking through a stereoscope which showed the picture in three dimensions, they learned how to distinguish a building that was a target from one that was not, or a false target from a real one. They scanned pictures through magnifying glasses when a stereoscopic view was not practical. They knew how to identify blast furnaces by the type of dirt outside the buildings,

and, what was most difficult, how to assess the extent of the damage to determine whether the target must be hit again. Photo-interpreting is extremely tedious work but the Wacs were so painstaking and patient that they were conceded to be invaluable and more useful than men on the same job.

A central headquarters cleared all aircraft for flying over the U. K. A clearance for operational aircraft entitled it to fly over otherwise restricted areas. Non-operational flights were cleared so as to avoid being shot down by friendly anti-aircraft. Wacs placed numbered and colored pins on base maps to indicate daily flying conditions: navigational warnings of restricted (anti-aircraft or bombing practice target) areas, pundits (the flashing lights by which aircraft are homed or warned), balloon barrages and nomads, and navigational flying corridors and anti-aircraft zones on the continent.



Wac checks radio in plane at Columbus Air Field.

Drama Of Distress Assist

One of the most dramatic of all overseas jobs was that which involved assisting aircraft in distress. When a plane was in trouble, it sent a distress signal on a secret frequency or, in cases of extreme emergency. sent a call in the clear over regular radio sets. WAC radio operators monitoring stations receiving emergency signals heard the plane, answered it, and asked for a transmission in order to obtain a fix. A Wac operating a highly directional antenna, surmounted by a circular metal ring marked off by degrees to 360°, listened over headphones to the signal as she swung the antenna around. At the point on the circle where the signal was loudest she took the bearing or compass direction of the plane. Such bearings were normally taken from a signal of less than ten seconds' duration.

All direction finding stations within range of the call notified, over a direct phone, the map-covered plotting table at headquarters of the bearing of the aircraft. Three bearings were taken to accurately determine the position of the plane, although two would do if necessary. The position, or fix, was plotted by Wacs and marked on the map. WAC assistant signals' controllers were in continual communication with the aircraft. They asked questions to determine the extent of the plane's damage in case it was preparing to ditch or to make a forced landing. The controller radioed to the pilot the correct bearing to fly to reach the nearest emergency airdrome. Controllers also notified the air-sea rescue units immediately so that they might dispatch aid in the form of an amphibious plane, the nearest naval craft or a ground party.

A Wac at a Ninth Air Force station received the fix of a B-26 in distress over the English Channel. Calling the air-sea rescue unit on another phone while talking to the pilot, she kept up a running conversation until he ditched. A week later the same pilot came to the station to meet the Wac who had taken his distress call. He told her that no one would ever be able to realize how good her voice sounded to him while she talked him into comparative safety.

Eager Beaver Wacs

When the Air Forces moved into areas where the Ground Forces were fighting, the Wacs went with them. Wacs with the Ninth Air Force landed on Omaha Beach in September 1944, traveled on foot, carried their own gear, and lived in shelter halves in the apple orchards of Normandy. They voluntarily replaced airmen who had been working steadily without a rest by taking over the teletypes, direction finders, telephones or kitchen duties. They were eager to work and grumbled when they were not kept busy.

This insistence on being kept busy was common to WAC units everywhere. An inspection of the WAC unit in the Far Eastern Service Command in February 1945 revealed no expected feminine complaints about mosquitoes, mud, heat, tents or anything else except jobs. Classification and job assignment were improved and the complaints diminished accordingly.

Air Force Wacs in the Pacific and in the China-Burma-India Theater were transported by air from place to place. Wacs disembarked in New Guinea while Hollandia was under Jap bombardment. They landed on Leyet a little more than a month after the beachhead had been secured and moved into Luzon while snipers were active, Jap para-troopers were still being dropped, and foxholes were considered an essential part of everyone's equipment.

The standard WAC uniform underwent many changes when worn in combat areas. It was obvious that the designers of WAC clothing had never operated a switchboard in the penetrating damp of a bombed cellar or lived in a tent in the Philippine mud. The clothes were not warm or water-resistant enough for the biting cold and insistent drizzle of European winters. WAC field shoes were not heavy enough for the muck of the Pacific and soldiers' shoes had to be substituted. Herringbone twill pants instead of WAC shorts were the order of the day in the Southwest Pacific because of the mosquitos and other insects. Wacs in the CBI found it necessary to change their clothes three times a day, cut the sleeves off their shirts, wear slacks in the evening, and wear socks and Indian sandals because of the extreme heat.

WAC officers and nurses in England learned the importance of proper dress the hard way. The women of the British Forces invited some of them to a reception in honor of the

Princess Royal, the King's sister. Upon arrival at the city hall in Peterborough, they checked their hats and gloves and walked what seemed to be miles to the reception hall. They were asked to return to the cloakroom to get their hat and gloves, because the senior ATS (British officer Wacs) was wearing hers. Properly accoutered they came back to the reception hall, only to be told that the director of the WRNS (British Waves), senior to the ATS representative, had appeared hatless and gloveless and the Wacs must dispose of theirs. They retreated to the cloakroom again and took off the offending items. After hurrying back they were informed that they could not be presented without hats and gloves because the Princess was wearing them. They retrieved these essentials once more and were finally allowed to go down the receiving line.



Link Trainer instructor.

Living quarters varied as much for Wacs as they did for male soldiers. Wacs in England lived in Nissen huts "in a mudhole," in town houses near Grosvenor Square in London or in country mansions "with a ruffle around the bathtub." They became accustomed to bolting to a slit trench from their bunks during night raids, donning slacks, bathrobe, and helmet as they ran, and afterward returning to bed all without really waking up. Because of the omnipresent blackout and fog WAC drivers were used to inching twenty miles in three hours.

Wacs stationed in or near Paris lived in requisitioned hotels and private homes. The first contingent in France lived in tents which they pitched and folded themselves. They were so well indoctrinated as to the hazards of potential booby traps that a group asked ordnance personnel to investigate some suspicious looking eggs on the stove of an abandoned farmhouse near Chartres. The eggs had been left behind by some American soldiers.

Women stationed in Italy slept in tents, a tobacco factory, a bombed palace, and hotels. Home for Wacs in Casablanca was a barracks surrounding a patio which had been a public square. The ATC unit at Accra was quartered in a one story barracks with verandas on both sides. (Three months after their arrival on the Gold Coast, sixty percent of the women were enrolled in USAFI courses and seven of them were instructors. This was in addition to their regular duties.)

A ten acre jute mill in Calcutta was converted into a combination barracks and office for both men and women troops. Native labor was cheap and everyone hired servants to polish their shoes, wash and iron their uniforms, or mend their mosquito nets. Wacs carried vegetable seeds, flowering bushes, baby chicks, and laying hens to their tents in the Pacific jungles. The bodies of Jap troops killed in a mission school in Manila were hastily removed so that Wacs might have a place to sleep.

The impact of women in uniform upon officers who had not seen a competent American secretary in two years and GI's who had not talked to an American girl in two years was inestimable in terms of increased efficiency and higher morale. Women soldiers ate K rations, bathed in helmets, drank Halazone purified water, crouched in foxholes, sloshed in mud, or slapped at mosquitos, as did nurses and soldiers, and were proud of the chance to share in their work. The Wacs wanted no special favors because they were women, and any extras accorded them were done on the initiative of men, as a friendly gesture or because of imagined or real physical incapacity.

Those Wacs who did not go overseas contributed as much to the war effort as did their friends who smelled smoke in faraway places. There was little glamor and excitement in filing papers at Lowry Field or driving officers from the Pentagon to Bolling Field, and women sometimes doubted their usefulness. Their attitude was akin to that of many officers and men who complained because they were not sent overseas. They forgot that it takes many essential people in rear areas to keep one man fighting at the front.

The plans for utilization of women in the Army had many unwritten restrictions which vanished as women proved their worth time and again by fulfilling their mission to make men available for combat duty. Originally, they were not to be assigned to more than four kinds of jobs; they eventually filled more than 239 kinds and were admitted to all schools except those for combat training. Only a few were to go overseas; at least 7,000 Air Force Wacs and 8,000 Ground Force Wacs served outside the continental United States. Although no one thought American women would serve on the fighting fronts, Wacs first landed in France 38 days after D-Day. Women soldiers were awarded the Distinguished Service Medal, Legion of Merit, Bronze Star, Soldiers Medal, Air Medal, and Purple Heart.

Women won another battle in the never-ending struggle for equal rights during World War II. Public opinion was as set against women in the armed forces as it had been against women who wore their dresses above their ankles, used lipstick, worked for a living, or entered a voting booth. The victory earned by the impressive wartime record of women who accepted a regimented and disciplined way of life with the same degree of equanimity as men, was realized in the enactment of a law which authorizes women to serve side by side with men in the regular Army, Air Force, Navy, and Marines. Just as people are no longer horrified when a woman smokes, they will soon show no surprise to find that the initials, M. J., before a sergeant's name, might stand for Mary Jane.

STATE DEPARTMENT COMMUNICATIONS

By Harry E. Fisher (Capt., Sig. Corps. Res.)

Officials in Washington, following minute-by-minute the world-important developments at the UN General Assembly in Paris, have been furnished the speediest and most extensive communications facilities ever available by the State Department through the American commercial communications carriers.

The completely secret communications between Paris and Washington came and were sent out over systems geared to a level of greater adequacy and efficiency than even during World War II. —(News item, Telecommunications Reports.)



Telegraph branch, State Department's division of communications.

Heavy user of commercial and military international cable and radio circuits the Department of State maintains in Washington a modern terminal and relay center for communicating with its more than 350 foreign service posts throughout the world. The center is operated by the telegraph branch of the department's division of communications and records. All international traffic for the U. S. Government, other than military, is handled by State. This includes the heavy traffic of the new Economic Cooperation Administration.

As a large percentage of the messages passing through the telegraph branch are classified, an extensive cryptographic operation must be maintained. The entire telegraph operation is on a round-the-clock basis, 7 days a week.

Like military or press association communications personnel, State's operators find their work load quickly affected by news developments anywhere in the world. A riot in South America, a cabinet change in France, or a development in Berlin quickly shows in the daily word counts. What happens in Budapest or Shanghai late Tuesday may decide whether telegraph branch people will be called from bed to augment a normal Tuesday midnight shift, to rush out instructions to foreign service posts or to receive the comments of ambassadors.

In fulfilling its mission, the telegraph branch also provides personnel to augment embassy staffs abroad at important meetings. A small group from this branch, working through facilities of the American Cable and Radio Corporation, maintained the only communications service in operation between the United States and Bogota, Colombia during the revolutionary rioting there in the spring of 1948. All news from Bogota during the first hours of the revolution came through the State Department group. Branch personnel kept traffic flowing even while the first floor of the building in which they were stationed was on fire, and machete-wielding rioters swarmed the streets below. Although no telegraph personnel were injured, all went for long periods without sleep and without food. During the rioting a courier from another branch of the division of communications and records was attacked by natives using machetes but escaped with slight injuries.

Personnel from the branch have attended all meetings of the Council of Foreign Ministers and most major international conferences in the past three years to maintain the highly specialized communications required with Washington.

In order to keep up with day-to-day changes in the international telecommunications picture, both commercial and military, information is collected constantly and up-to-the-minute routing guides for the use of the branch are maintained, providing both normal routings and a variety of emergency routings to meet special international political or atmospheric conditions. In using commerial facilities, a fair balance among carriers is maintained in order to insure equitable distribution of government business among the carriers.

So that operators going out to foreign service posts may have up-to-the-minute training, the branch provides operational code and cipher training, and occasionally gives refresher courses for supervisors of code and communications centers of key U. S. embassies and legations.

Communications watch officers, on duty 24 hours a day, watch over the flow of incoming traffic in order to give instant notification to key officials on important developments abroad. These officers have authority to call the Secretary of State or even the President if conditions warrant. Their function has reached extra importance with the development of the present tense international situation.

Watch officers, in addition to keeping up with the flow of telegraphic communications, must handle a variety of special duties on week-ends and after normal business hours. At such times, the watch officer is, to a considerable extent, "The Department of State" and must be prepared to meet a variety of emergencies. If the foreign minister of another country desires to talk by phone with the Secretary of State at midnight, the person who first receives the call will be the watch officer. If the Soviet embassy, on sudden Moscow instructions, must deliver a diplomatic note to the Department of State at 3:00 a.m., the watch officer will receive it.

With the full cooperation of all communications companies, as well as the Army, Navy and Air Force, the branch uses the latest procedures and equipment available. The shop was completely redesigned when moved from the old State Department building in Washington to the new building at 21st and Virginia Avenue in 1947 and constant improvements are being made from month to month. A further improved layout is already being designed for use in the new addition to the State Department building to be constructed shortly.

ASSOCIATION AFFAIRS

ARMED FORCES COMMUNICATIONS ASSOCIATION

1624 I Street, N. W., at Connecticut Ave., Washington 6, D. C.

OFFICERS AND DIRECTORS

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1st Vice-Pres.: Wm. J. Halligan
2nd Vice-Pres.: Darryl F. Zanuck
3rd Vice-Pres.: A. W. Marriner
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5th Vice-Pres.: E. K. Jett
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Dr. J. A. Stratton (1949)
J. Harry LaBrum (1949)
John J. Ott (1949)
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Carroll O. Bickelhaupt (1950)
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Thomas H. A. Lewis (1950)
Thomas A. Riviere (1950)
Dr. Lee De Forest (1950)
William C. Henry (1951)
Dr. Frank B. Jewett (1951)
Fred R. Lack (1951)
Leslie F. Muter (1951)
Charles E. Saltzman (1951)
S. H. Sherrill (1952)

1949 Annual Meeting

At a conference at the Navy Department on October 4th, final decision was made to hold our annual meeting in Washington on April 4th and 5th and, possibly, the 6th. Among staff officers of the Navy Department attending the conference were: Rear Admiral E. E. Stone, Chief of Naval Communications, with Capt. C. F. Horne and Capt. R. J. Foley; Col. A. F. Binney, USMC, Bureau of Aeronautics; Capt. H. D. Baker, Office of Public Information; Comdr. T. W. Rogers, Bureau of Ships; Mr. Earl A. Nash, Office of Naval Research; and Mr. M. E. Jansson, Naval Research Laboratory.

Tentative plans call for a meeting of the AFCA Council and Board of Directors on the afternoon of April 4th, with the banquet that evening. The general business meeting will be held on the 5th, followed by demonstrations and exhibitions of Naval equipment at the research laboratories, Anacostia Naval Air Station, the Naval Gun Factory and other points in the Washington area.

Research Development Board

The following officers of AFCA were invited to attend the symposium on Communications Research at the Department of Commerce Auditorium, Washington, on October 11, 12 and 13: Directors Lee De Forest, F. B. Jewett, Julius Stratton and Harold A. Zahl, and Executive Secretary S. H. Sherrill. A description of the subjects discussed appears elsewhere in these pages.

New Munitions Board Chairman

On October 7th, the Executive Secretary conferred with Mr. D. F. Carpenter, newly appointed Chairman of the Munitions Board. Mr. Carpenter replaced Mr. Thomas J. Hargrave in September. Mr. Hargrave, it will be remembered, was the principal speaker at the AFCA annual meeting at Dayton in May.

Special Committee

Maj. Gen. Spencer B. Akin, Rear Adm. Earl E. Stone, Maj. Gen. F. L. Ankenbrandt, Brig. Gen. A. W. Marriner, Mr. F. R. Lack, and Col. W. W. Watts have accepted President Sarnoff's invitation to serve on a special committee, under the chairmanship of Mr. Theodore S. Gary, to determine ways and means of broadening the scope of AFCA and increasing its membership.

Civil Defense Planning

The Executive Secretary conferred on September 13th with Mr. Russell J. Hopley, Director of Civil Defense in the National Military Establishment. The AFCA committee on radio amateurs for emergency use submitted its tentative plan through National Headquarters for consideration by Mr. Hopley's Board. Communications are of tremendous importance in civil defense. Secretary Forrestal recognized this when he appointed Mr. Hopley, who is President of the Northwestern Bell Telephone Co., and stated that he was anxious to get into this initial planning someone from the Telephone Company because it seemed to provide an automatic network of communication and contacts at local levels throughout the country.

Study of Problems

The Philadelphia Chapter has submitted its report on the seven problems presented to certain chapters for study, through National Headquarters, by the Army, Navy and Air Force. The Philadelphia Chapter also was the first to submit comments on the draft of regulations for renegotiations procedures being studied for the Munitions Board.

CCAFA and Annual Industry-Army Day

At its meeting at the Army-Navy Club on September 2nd, the Coordinating Committee for Armed Forces Associations selected February 4, Boston, Mass., as the time and place for the 1949 Industry-Army Day meeting. Lt. Col. George T. Cottle, representing the Boston Chapter of AFCA, is in charge of initial plans for the meeting.

In 1947 the several Army Associations joined to sponsor the initial Industry-Army Day in Chicago. Fifteen hundred leading industrialists including those in communications and photography, attended the meeting and heard the top military planners give them confidential reports on the activities and plans of the Army. In

National Advisory Committee Chairmen

GENERAL MANUFACTURING: Mr. Fred R. Lack, V. Pres., Radio Division, Western Electric Company, New York City

BATTERY MANUFACTURING: Dr. George W. Vinal, Bureau of Standards, Washington, D. C.

DRY BATTERY SUBCOM.: Mr. Ralph E. Ramsay, V. Pres. & Research Director, Ray-O-Vac Company, Madison, Wisconsin

STORAGE BATTERY SUBCOM.: Mr. L. E. Wells, Chief Engineer, Willard Storage Battery Company, Cleveland 1, Ohio

RADIO MANUFACTURING: Mr. Fred R. Lack, V. Pres., Radio Division, Western Electric Company, New York City

TELEGRAPH EQPT. MFG.: Colonel Julian Z. Millar, The Western Union Telegraph Company, New York City

TELEPHONE EQPT. MFG.: Mr. C. D. Manning, V. Pres., Kellogg Switchboard & Supply Company, Chicago, Illinois

COMPONENTS MFG.: Mr. R. C. Ellis, V. Pres., Raytheon Manufacturing Company, Waltham, Masachusetts

PHOTOGRAPHIC EQPT. MFG.: Mr. H. A. Schumacher, V. Pres., Graflex, Inc., Rochester, N. Y.

RADAR: Mr. George F. Metcalf, Manager, Electronics Laboratory, General Electric Company, Syracuse, N. Y.

WIRE MANUFACTURING: Mr. H. Donn Keresey, Pres., Anaconda Wire & Cable Co., New York City

PUBLICITY: Mr. Orrin Dunlap, Jr., RCA, 30 Rockefeller Plaza, New York 20, N. Y.

MILITARY TRAINING: Major Gen. G. L. Van Deusen, Pres., RCA Institutes, Inc., 340 West 4th St., New York 13, N. Y.

he evening, after individual cocktail parties sponsored by each association, all gathered at a banquet in the main ballroom of the Stevens Hotel to hear General Eisenhower deliver an inspiring address. A similar, though smaller, meeting was held at Dallas, Texas, in January 1948, at which General Omar Bradley was the speaker.

At the September meeting of the Coordinating Committee for Armed Forces Associations the guests were: Mr. Harold Hinton, Assistant to Secretary Forrestal; Maj. Gen. Bryant E. Moore, Chief, Public Information Division, Army; Rear Admiral Edward C. Ewen, Chief, Navy Public Information Division; Mr. Stephen Leo, Chief, Public Information Division, Air Force; and Major Walter E. Griscti of General Moore's office. During the meeting, General Moore delivered replies to questions previously submitted to him by the Coordinating Committee. It was decided that the mentioned guests, or personnel from their offices, would be invited to future meetings to answer questions of vital concern to the various associations. Questions and answers in part were as follows:

1. *Question:* Is there anything to the rumor that the General Staff of the Department of the Army leans toward the abolition of the several technical services, and, if so, what is proposed to take their place?

Reply: There is no intention of abolishing the technical services. Their functions are basic to the functioning of the Army. There are questions of coordination and overlapping that must receive constant study and adjustment from time to time.

Question: What is proposed, if anything, in connection with the functions of the Post Exchange service? Is this to be unified? Should it not be a normal function of the Quartermaster Corps and should not the procedures in connection with this service be the same in overseas theaters and the zone of the interior?

Reply: I know of no move to take the Post Exchange service from under control of the Special Services division. Unification of Army Post Exchanges with other service exchanges is being studied but there is no definite answer on this point as yet. Since the Army Post Exchange cannot be run on appropriated funds, the Quartermaster Corps cannot properly administer this service. The Quartermaster Corps does however perform certain procurement services for the Post Exchange system.

3. *Question:* Reserve personnel requests frequently that we furnish, in the columns of our magazine, information of interest concerning policies for the civilian components. It would be mutually advantageous if information concerning these matters could be published as soon as possible after decision is made—even if they may reach interested officers before the official circular is mailed to them. A case in point is the recent publication of regulations concerning inactive duty credits toward promotion in the Army and Air Force.

Reply: Col. C. H. Ruth, Assistant to the Executive of Reserve Affairs, advises that they will be happy to place any interested association journal on their list of timely circulars, written policy and other information affecting Reserve affairs. If any of the associations are interested in being placed on the Executive for Reserve Affairs' mailing list of new circulars, Army regulations and policies, they should contact Maj. Walter E. Griscti, PID, who will see that they receive same.

WHEN DOES YOUR MEMBERSHIP EXPIRE?

Look at the expiration date on your membership card. If it is within 30 days, it's time to pay your dues. Fill in this form and return with correct remittance. If you do not use the form please pass it on to a friend for his use in applying for membership.

Armed Forces Communications Association
1624 Eye Street, N.W., Washington, D. C.

Enclosed is $..... for membership (new) (renewal) for one year in the AFCA.
(Full—$5.00) (Retired or Enlisted—$3.00) (Student—$2.00)

Name .....

Address .....

City ..... State .....

Unit Competition

Special letters, inviting units of the Army, Navy and Air Force to compete for the annual award based on the largest number of members, have been sent to units in the United States and overseas. The competition ends on March 1, 1949. Last year's winner was the 72nd Signal Service Battalion stationed in Japan.

Dividend Checks

Checks are being mailed to chapters each month for the amount earned under the new policy of $1 for each $5 membership, and $50 for each $200 group membership and $10 for each $100 group membership in the chapter area. The largest payment made in August was $143 to the Chicago Chapter, and in September $255 to the New York Chapter.

National Board of Directors

Our constitution, copies of which were mailed to each chapter in October, requires the election by the chapters of one representative on the National Board of Directors for each 100 members or fraction thereof in the chapter. These directors take office on January 1st and serve for one year. Their names will be published in January SIGNALS.

Second Army Caravan

On its five weeks' tour through Ohio, Indiana and Kentucky, the Second Army caravan will include information for Reserve personnel and others concerned about AFCA and its purposes in the interest of national defense. The caravan left Fort Meade on October 11th.

Chapter of the Year

Except for points earned for new and renewal members, the European Chapter continues in the lead for the Chapter of the Year. The second issue of their excellent illustrated magazine, "European Chapter Review," carries feature articles as follows: "The Post War Inauguration, Initial Operation and Development of the Western Union Telegraph Company in the U. S. Occupied Zone of Germany"; "Organization and Control of Telecommunications within the United States Zone of Germany between July 1945 and July 1948—Telephone Phase"; "Operation Vittles: Lifeline of Democracy"; "The Dialing Telegraph System as Developed in Germany."

Industrial Minute Men of 1949: Communications & Photography

Listed below are the names of the American firms who are group members of the Armed Forces Communications Association. By their membership they indicate their readiness for their share in industry's part in national security. These firms and their employees are a part of that patriotic group which Secretary Forrestal said is needed so that the armed forces can learn of the most advanced industrial and commercial techniques, and to which they may turn for advice on research, manufacturing, procurement and operation.

Acme Newspictures, Inc.
Admiral Corporation
American Phenolic Corporation
American Steel & Wire Company
American Telephone & Telegraph Co.
American Time Products, Inc.
Anaconda Wire & Cable Company
Arnold Engineering Company
Astatic Corporation
Automatic Electric Company
Automatic Electric Sales Corp.
Baltimore News Post
Baltimore Radio Show, Inc.
Bell Telephone Company of Pa.
Bendix Radio
Bliley Electric Company
Breeze Corporations, Inc.
California Water & Telephone Co.
Capitol Radio Engineering Inst., Inc.
Carolina Telephone & Telegraph Co.
Chesapeake & Potomac Tel. Co.
Chicago Telephone Supply Co.
Cincinnati & Suburban Bell Tel. Co.
Cinch Manufacturing Corp.
Collins Radio Company
Colonial Radio Corp.
Commercial Radio-Sound Corp.
Copperweld Steel Company
Cornell-Dubilier Electric Corp.
Corning Glass Works
Coyne Electrical School, Inc.
DeJur-Amsco Corporation
Diamond State Telephone Co.
Drake Manufacturing Co.
Allen B. DuMont Laboratories, Inc.
Eastman Kodak Company
Hugh H. Eby, Inc.
Thomas A. Edison, Inc.
Electric Storage Battery Co.
Electronic Associates, Inc.
Electronic Designs, Inc.
Emerson Radio & Phonograph Corp.
Espey Manufacturing Co., Inc.
Federal Telephone & Radio Corp.
Freed Radio Corporation
General Aniline & Film Corp.
General Cable Corporation
General Electric Company
General Instrument Corp.
General Precision Equip. Corp. & Subs.
General Telephone Corp.
Gilfillan Bros., Inc.
Globe Wireless, Ltd.
Graflex, Inc.
Gray Manufacturing Co.
Hallicrafters Company
Haloid Company
Hazeltine Electronics Corp.
Heinemann Electric Company
Hercules Motors Corp.
Hewlett-Packard Company
Hoffman Radio Corp.
Ilex Optical Co.
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Indiana Steel & Wire Co.
International Detrola Corp.
International Resistance Co.
International Tel. & Tel. Corp.
Jacobsen Manufacturing Co.
Kellogg Switchboard & Supply Co.
Lasting Products Co.
Leich Sales Corporation
Lincoln Telephone & Telegraph Co.
Link Radio Corporation
Machlett Laboratories, Inc.
Magnavox Company
P. R. Mallory & Co., Inc.
Massachusetts Radio & Telegraph School
Merit Coil and Transformer Corp.
Michigan Bell Telephone Company
Mines Equipment Company
Mountain States Tel. & Tel. Co.
Mutual Telephone Company
National Carbon Company, Inc.
National Fabricated Products, Inc.
New England Tel. & Tel. Co.
New Jersey Bell Telephone Company
New York Telephone Company
North American Philips Co., Inc.
Northwestern Bell Telephone Co.
Oak Manufacturing Co.
Ohio Bell Telephone Co.
O'Keefe & Merritt Company
Okonite Company
Olin Industries, Inc.
Operadio Manufacturing Company
Pacific Telephone & Telegraph Co.
Philco Corporation
Radiart Corporation
Radio Condenser Company
Radio Corporation of America
RCA Victor Division
Rauland Corporation
Ray-O-Vac Company
Reeves Instrument Corp.
Servo Corporation of America
Sherron Electronics Co.
Sonotone Corporation
Southern Bell Tel. & Tel. Co.
Southern New England Tel. Co.
Southwestern Bell Telephone Co.
Sparks-Withington Company
Sperry Gyroscope Company
Stackpole Carbon Company
Standard Piezo Company
Stewart-Warner Corporation
Stromberg-Carlson Co.
Stupakoff Ceramic & Mfg. Co.
Sylvania Electric Products, Inc.
Telephone Services, Inc.
Teletype Corporation
Times Facsimile Corporation
Tri-State College
Tung-Sol Lamp Works, Inc.
Tyler Commercial College
United Radio Television Institute
United States Electric Mfg. Corp.
United States Rubber Company
Wm. H. Welsh Co., Inc.
West Coast Telephone Company
Western Electric Company, Inc.
Western Union Telegraph Co.
Westinghouse Electric Corp.
Weston Electrical Instrument Corp.
Willard Storage Battery Co.
Wisconsin Telephone Company
Wollensak Optical Company

Chapter News

☆ ☆ ☆ ☆ ☆ **Chapter Of The Year, 1948 — Far East, George I. Back, President** ☆ ☆ ☆ ☆ ☆

AREA REPRESENTATIVES FOR CHAPTERS

Area A: George P. Dixon, IT&T Corp., 67 Broad St., New York, N. Y. New England States, New York, New Jersey and Delaware

Area B: J. H. LaBrum, Packard Building, Philadelphia, Pa. Indiana, Kentucky, Maryland, Ohio, Pennsylvania, West Virginia and Virginia

Area C: W. H. Mansfield, Southeastern States along Atlantic and Gulf coasts—from North Carolina to Mississippi and including Tennessee

Individuals interested in chapter activities should communicate either directly with National Headquarters or with the proper area representative.

CHAPTERS AND SECRETARIES

ATLANTA: Maj. Peter J. Ryan, Hqs. 3rd Army, Ft. McPherson, Ga.

BALTIMORE: Col. Walter J. Rosengren, Baltimore Signal Depot, Middle River, Md.

BOSTON: Capt. F. P. Singleton, Boston Army Base, Boston 10, Mass.

CHICAGO: Col. Raymond K. Fried, 111 W. Monroe St., Chicago 3, Ill.

CLEVELAND: H. E. Schafer, Radiart Corp., 3751 W. 62nd St., Cleveland 2, Ohio.

DALLAS: E. H. Mittanck, Rm. 816, Telephone Bldg., Dallas, Tex.

DAYTON: Gertrude A. Knight, 54 Patterson Village Dr., Dayton, Ohio.

DECATUR: E. C. Whitcomb, RR 6, Box 263, Decatur, Ill.

EUROPEAN: William M. Hart, ICD, OMGH, c/o Radio Frankfurt, APO 757, New York, N. Y.

FAR EAST: Maj. C. B. Whittenberg, Sig. Sec., GHQ., FEC, APO 500, c/o PM, San Francisco, Calif.

FORT MONMOUTH: Col. William L. Seibert, Squier Signal Laboratory, Fort Monmouth, N. J.

KENTUCKY: Clyde T. Burke, Lexington Signal Depot, Lexington, Ky.

LOUISIANA: A. Bruce Hay, Southern Bell Tel. & Tel. Co., New Orleans, La.

NEW YORK: Col. William H. Harrington, 195 Broadway, New York 7, N. Y.

OGDEN-SALT LAKE: Miss Marjorie Hansen, 2227 Adams Ave, Ogden, Utah.

PHILADELPHIA: Joseph Bergman, Sig. Corps Stock Control Agency, 2800 So. 20th St., Philadelphia, Pa.

PITTSBURGH: K. A. Taylor, Bell Telephone Co., 416 7th Ave., Pittsburgh, Pa.

RICHMOND: Lelia V. Fussell, Ches. & Potomac Tel. Co., 703 E. Grace St., Richmond, Va.

RIO: Maj. Huston Maxwell, JBUSMC, APO 676, % Pm, Miami, Fla.

SACRAMENTO: Lt. Col. George H. Melvin, Jr., Sacramento Signal Depot, Sacramento, Calif.

SAN FRANCISCO: Capt. John H. Meyer, 1930 Prince St., Berkeley, Calif.

ST. LOUIS: Capt. Henry C. Hughes, 319 No. 4th St., St. Louis 2, Mo.

SEATTLE: Capt. Lawrence W. Bucy, Alaska Communication System, Seattle 4, Wash.

SOUTHERN CALIFORNIA: K. E. Lambert, MGM, Hollywood, Calif.

SPANISH WAR VETERANS DIVISION: George A. Marshall, Adj., 215 Montague St., Brooklyn, N. Y.

WASHINGTON: Col. Edward C. Cover, Chesapeake & Potomac Tel. Co., 725 - 13th Street, N. W., Washington, D. C.

STUDENT CHAPTERS

CORNELL: John M. Ross, 126 McFaddin Hall, Ithaca, N. Y.

NEW YORK UNIVERSITY: Robert D. Hawkins, 25 Spruce Ave., Ridgefield Park, N. J.

OKLAHOMA A & M: W. D. Manahan, Okla. A & M College, Stillwater, Okla.

STATE COLLEGE OF WASHINGTON: Stuart W. McElhenny, 604 California St., Pullman, Wash.

TEXAS TECH: T. L. Timmons, 2012 8th St., Lubbock, Texas.

UNIVERSITY OF CALIFORNIA: R. G. Barhite, Bowles Hall, U. of Calif., Berkeley, Calif.

NATIONAL HEADQUARTERS CHAPTERS SECRETARY: JULIA B. GODFREY

Atlanta—D. A. McKeever, President

A meeting of the Atlanta Chapter was held on December 1st. Rear Admiral Earl E. Stone, Chief of Naval Communications, came from Washington to deliver the principal address. Details of the meeting will appear in the next issue.

Baltimore—Frederick E. Moran, President

The first fall meeting of the chapter was held on October 12th at the Consolidated Gas Electric Light and Power Company of Baltimore. Mr. Ralph L. Thomas, Vice President in charge of operations, gave a speech on the grid in the Baltimore area and the various generating stations that supply current to that area. A demonstration followed of the load analyzer board and load dispatching board which are used to control the power supply in the entire network.

The Western Electric Company Point Breeze Plant will be host to the chapter at its next meeting.

Honor Units
Member Contest 1948
72nd Signal Service Battalion
304th Signal Operation Battalion

Boston—Walter F. Schuchard, President

The Boston Chapter will work with chapters of other military associations to sponsor the third annual Industry-Army Day meeting at Boston on February 4th, at which General Omar Bradley will be the principal speaker. At the initial meeting on October 28th to discuss plans, Lt. Col. George T. Cottle of the Boston Chapter was host. Maj. Walter Griscti from the Army Department in Washington outlined plans for Industry-Army Day. At a later meeting held on November 4th, the chapter was represented by Mr. Charles F. Adams of the Raytheon Manufacturing Co., and Vice-President T. M. Hennessey of the New England Telephone & Telegraph Co.

Decatur—Emerson A. Shultz, President

Chapter members attended a dinner meeting at the Decatur Club on September 16th. President Shultz introduced Lt. Col. John F. McCarthy, new commanding officer of the Decatur Signal Depot, and Mr. F. L. Kahn of the Automatic Electric Company. Mr. Kahn, who is in charge of circuit design for his company, discussed the Strowger automatic telephone system and demonstrated the automatic toll director.

Kentucky—Wm. M. Mack, President

A dinner meeting of the Kentucky Chapter was held on October 22nd at the Phoenix Hotel in Lexington. The guest speaker, Mr. Bernard T. Fagan, coordinator for the Lafayette Vocational School in Lexington, discussed the future of television and predicted that within two or three years relay stations at 50-mile points will provide Lexington with television reception.

President Mack announced that Col. C. A. Carlsten, Director of the Communications Department of the Armored School at Fort Knox, has invited the Kentucky Chapter to hold its next meeting on November 19th at Fort Knox. The highlight of the meeting will be a tour of the Armored Force School.

The program was completed with the showing of a technicolor film of the Kentucky-Georgia football game.

The current membership drive being conducted by the chapter has already resulted in a 100% increase in membership.

Louisiana—Harry B. Lackey, President

For more than thirty years, the American Telephone & Telegraph Company and its separate subsidiaries have taken the lead in initiating closer cooperation between industry and the armed services. In World War I and before, the closest liaison existed between the company and the Army and Navy. Assistance and advice in communications matters for national defense have always been available. For this reason, it was not surprising that the Southern Bell Telephone & Telegraph Co. should have been the sponsor for the organization meeting of the newest AFCA chapter formed in New Orleans on October 28th.

Under the guidance of Mr. W. H. Manfield, AFCA chapter representative for the Southeastern part of the United States, and Ralph Grist, both Southern Bell executives and active in the Atlanta Chapter, Bruce Hay, Division Sales Manager of the Bell Company in New Orleans, arranged a splendid dinner meeting at the Roosevelt Hotel at which the initial plans were laid for what promises to be one of the best chapters of the Association. Mr. Mansfield and Mr. Grist came from Atlanta for the meeting, at which more than sixty top-flight communications and photographic executives and engineers of the Army, Navy, Air Force and industry were present. Brig. Gen. S. H. Sherrill, National Executive Secretary, who came down from Washington, outlined the aims and purposes of the AFCA, its accomplishments since its organization, and described the activities of the twenty-four other chapters and the procedure for the organization of a chapter in New Orleans and Louisiana.



Spanish War Division, U. S. Veterans Signal Corps Assoc. met in Washington, D. C. in August.

Harry B. Lackey, District Manager of the Southern Bell, was elected interim president of the chapter. Other temporary officers elected were the following vice-presidents: Capt. Glenn W. Legwen, communications officer of the Eighth Naval district, to represent the Navy; Col. A. H. Schroeder, commander of Camp Leroy Johnson, Army; Col. Herbert De Buys, Air Force; the Very Rev. Thomas Shields, S.J., president of Loyola University, colleges; George W. Healy, Jr., newspapers; C.C. Walther, industries; Jimmy Bryant, motion pictures; and Streuby L. Drumm, power utilities. Fred Weber was elected treasurer, and A. Bruce Hay, secretary. President Lackey said permanent officers and committees will be named and a membership drive will soon be started.

New York—George P. Dixon, President

Some 175 members and guests attended the dinner meeting of the New York Chapter on October 20th at the Seventh Regiment Armory, New York City. The program began with the first public showing of a captured film, photographed in color by Eva Braun, of Hitler and his friends during the early days of the war. This was followed by a short talk by Maj. Horace Roberts of the Signal Corps Photographic Center regarding the work being carried on there. Maj. Roberts then showed a film depicting scenes in the life of General Pershing.

The following officers were unanimously elected for the ensuing year: President — Col. George P. Dixon; Vice President — Lt. Col. Ralph G. Edwards; Secretary — Col. William H. Harrington; Treasurer — Maj. Theodore N. Pope; Board of Directors — Brig. Gen. A. W. Marriner, Col. Thomas R. Putnam, Brig. Gen. Samuel M. Thomas, Capt. David R. Hull, Mr. George W. Bailey, Brig. Gen. Carroll O. Bickelhaupt, Lt. Col. W. L. Hallahan, Maj. Gen. H. C. Ingles, Mr. Dwight R. G. Palmer, Maj. W. H. Rivers, Lt. Col. E. R. Shute, Col. Morton Sultzer and Col. Robert R. Yeager.

Philadelphia—W. W. Watts, President

The first meeting of the current season was held at the Officers' Club, Quartermaster Depot, Philadelphia, on October 14th. Among the topics discussed was the forthcoming World Hobby Exposition and the Signal Corps exhibit. This exposition was held in Philadelphia from November 15th to the 20th. The chapter was in charge of distribution of booklets, magazines and other information about AFCA to interested visitors to the show.

The Philadelphia Chapter was the first to submit to national headquarters comments on the renegotiation regulations which were requested by Asst. Secretary Barrows of the Air Force. The chapter was also the first to submit recommendations on the seven problems being studied by the AFCA for the Army, Navy, and Air Force.

Pittsburgh—F. E. Leib, President

The opening meeting of the fall season was held on October 12th. The following officers were elected: President — F. E. Leib; First Vice President — E. J. Staubitz; Second Vice President — E. C. Stern; Secretary — K. A. Taylor; Treasurer — C. A. McKenney; Asst. Treasurer — S. W. Dana. Plans for the year are being prepared by the new officers. Emphasis is being placed on increasing the group membership and also the number of civilian members. Consideration is being given to open forum meetings with speakers from the membership and local industrial and manufacturing concerns.

Richmond—E. T. Maben, President

At a dinner meeting held at Ewart's on October 13th, the principal speaker was Capt. Robert J. Foley, assistant to Admiral Earl E. Stone, Chief of Naval Communications. Capt. Foley, who had a distinguished record as a submarine commander in the Pacific during World War II, devoted the major portion of his address to a description of many of the most interesting phases of submarine combat in the Pacific.

President Maben acted as toastmaster and introduced Mr. A. L. Lambdin, the first president of the Richmond Chapter, who spoke about developments made by the chapter in the past year. Other speakers were Capt. Whitehead, former Naval officer, who emphasized some of the activities of Capt. Foley's submarine in the Pacific; and Brig. Gen. S. H. Sherrill, Executive Secretary, who discussed progress made by the Association in the last year and its objectives in the light of the current international situation.

Sacramento—L. J. Brundige, President

Dr. Otto J. M. Smith, of the University of California, was the main speaker at the Sacramento Chapter meeting on November 3rd. His subject was "Russia's Bomb." An added feature on the program was the film, "Tale of Two Cities"—the story of Nagasaki and Hiroshima.

Southern California—H. W. Hitchcock, President

The Southern California Chapter was successfully organized at its meeting on October 15th in Los Angeles. Officers were elected as follows: President — H. W. Hitchcock; Vice Presidents—T. H. A. Lewis, Arthur C. Hohmann, H. L. Hoffman; Secretary-Treasurer — E. F. Zacker.

Col. Lloyd C. Parsons, Signal Officer of the Sixth Army, attended as a guest of the chapter and discussed the aims and purposes of AFCA. The featured speaker of the evening was Capt. Harry C. Butcher, Naval Aide to General Eisenhower and author of the book, "My Three Years with General Eisenhower."

Washington—Frederick G. Macarow, President

Postponed from its originally set date of October 22d, the initial fall meeting of the Washington Chapter took place November 16th at Ft. Lesley J. McNair, the former War College.

Feature of the evening, following a buffet supper and a business meeting, was a discussion and demonstration of the new transistor by Dr. J. W. McRae, Director of Electronic and Television Research for the Bell Telephone Laboratories.

Dr. McRae also gave a report on current research in connection with microwave transmission, electron tubes, and fundamental physics.

STUDENT CHAPTERS

Oklahoma A & M

The first fall meeting of the chapter was held on September 24th. W. D. Manahan was elected Secretary. Plans were made for the year and various committees were appointed. Capt. Milton M. Berry of the Military Department of the College gave a short lecture on the potentials of America.

At the October 13th meeting, it was suggested that a ham net be set up between Arkansas University, Texas A & M, and Texas Tech. Professor Naeter of the Electrical Engineering Department addressed the gathering on new developments in electricity.

Movies for Chapter Meetings

Many interesting films may be secured for chapter meetings by applying to the Signal Officer of the Army area in which your chapter is located. The addresses are as follows:

Hqs. First Army — Governors Island, N. Y.
Hqs. Second Army—Fort George G. Meade, Md.
Hqs. Third Army—Fort McPherson, Atlanta, Ga.
Hqs. Fourth Army — Fort Sam Houston, Texas
Hqs. Fifth Army — Civic Opera Bldg., Chicago, Ill.
Hqs. Sixth Army—Presidio of San Francisco, Calif.

An especially interesting picture was recently released covering the life of General Pershing.

New Group Members

Commercial Radio-Sound Corp., New York, N. Y.

Coyne Electrical School, Inc., Chicago, Ill.

Freed Radio Corp., New York, N. Y.

General Aniline & Film Corp., New York, N. Y.

Hercules Motors Corp., Canton, Ohio.

Massachusetts Radio & Telegraph School, Inc., Boston, Mass.

Reeves Instrument Corp., New York, N. Y.

Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.

Tri-State College, Angola, Ind.

New Life Member

B. W. Cooke, Chicago, Ill.

Addresses Wanted:

Mail sent to the following listed members has been returned to us. If you know the current address of any of them, please drop us a postcard.

Lt. Howard C. Agne, Jr.
Capt. William A. Ball, Jr.
Harry F. Bauserman
Franklin H. Beck
Lt. Florence M. Belknap
Ralph G. Bellar
Maj. Edwin D. Bonner
S/Sgt. Harrison Breaux
Capt. Charles C. Britton
Lt. Col. Edward L. Burge
Obie M. Cates
Pvt. David C. Cipolla
Lt. Elam T. Clark
Maj. Lester H. Clark
Maj. Carvel J. Cole
Edwin J. Cooper
Pfc. Thomas F. DeLaney
W. B. Dunbar
Melvin C. Eckley
Sgt. William A. Ferry
Lt. Joseph Frank
Morten Gale
Lt. Roy C. Gibson
Leonard J. Gilbert
Louis Griffin, Jr.
Lt. Nathan H. Gwyn, Jr.
Capt. Leopold R. Haas
Capt. Albert C. Harley
Lt. John E. Hoover
William L. Jennings
Rudy H. Kawahara
Clarence D. Kirkeby
T/4 Francis X. Kish
T/4 Robert Klebart
S/Sgt. David M. Langworthy
Frank S. Larkin
John D. Lucey
Lt. Col. I. S. Lyster
Maj. Don W. Moore
James N. Murray
Maj. James D. McCauley
WOJG Thomas E. McGuire
Lt. Richard B. McKlveen
S/Sgt. Francis J. McLaughlin
Matthew F. McNulty
Lt. Walter D. ONeal
Lt. Col. Charles H. Phipps, Jr.
Pfc. Wilbert V. Porter
Lt. Emilie F. Quinto
Joseph S. Roemer
Lt. Charles E. Rogers
Paul G. Ross
Lt. Walter J. Royen
Kenneth B. Russell
Lt. Marvin H. Shaw
Maj. William McKinley Shepard
Pfc. James G. Smith
T/5 John T. Snodgrass, Jr.
Capt. Robert L. Somerville
T/5 John A. Sproule
Capt. George M. Strawn
John W. Thingvold
Leon R. Thomas
Capt. William D. Thompson
Evariste Turcotte
Floyd F. Walrath
Lt. Col. Fred J. Wheeler
Lt. Raymond C. Wison
Lt. Joseph M. Zinni

COMMUNICATIONS AND BROADCASTING SERVICES IN THE CIVIL DEFENSE PROGRAM

Communications are the "nerve system" of civil defense.

The American communications system is exceedingly efficient. In wartime, however, it may be severely damaged in areas under heavy attack; therefore every contingency must be provided for and sound plans developed so that in such an emergency communications in some form will be available. How to anticipate such problems should be the purpose of civil defense communications planning in cooperation with authorities in the communications field.

In each area or community the communications needs will vary, depending on geography, size, strategic importance, and likely extent of civil defense operations. Typical of the requirements in any efficient civil defense organization, are the following:

a. Communications facilities to properly equip Civil Defense Control Centers for receiving and transmitting information on air raids, summoning workers and special crews; for dispatching units and directing the many operations.

b. Air raid warning networks, consisting of wire and radio communications of the highest efficiency for speedy receipt and transmission of warnings.

c. Communications between air and ground in the event of atomic attack, for air reconnaissance to check on radiological activity; also to assist in the control of highways in connection with transportation and evacuation operations.

d. Mobile radio-telephone and walkie-talkie (short range radio telephone) for ground reconnaissance following atomic or gas attack, and for search and rescue work.

e. Effective police and fire communications systems.

f. All the special uses of radio broadcasting services for public information and guidance as well as for warning, also amateur radio operators' services.

g. There will be a need for communications from areas attacked for immediate transmittal of information to pre-designated civil defense control points. Communications will be imperative to facilitate quick appraisal of the extent of destruction, the type of attack, whether high explosive, atomic, chemical or other types of warfare, also for communicating with other points in order that organized assistance may be promptly dispatched, directed, and control instituted.

Organization for Communications Services

National Organization. It is proposed that a Communications Division with a small but competent staff be established in the Office of Civil Defense, with three branches: General Communications; Radio Broadcasting and Other Radio Services; Air Raid Warning and Aircraft Observers Communications.

The Division should be headed by a Chief of Communications, who should function on a parity with the Chief Signal and Communications Officers in the Military Establishment. In the event of emergency, the staff would be expanded to meet requirements of new conditions.

The Communications Division should be responsible for the overall planning of communications for civil defense, liaison and coordination with other staff members within the Office of Civil Defense, the Military Establishment, other governmental agencies, commercial communications and broadcasting companies. It should determine the technical specifications and formulate for civil defense organizations plans for communications systems to assist in the effective functioning of civil defense.

This Division and the Air Raid Warning and Aircraft Observers Division in the Office of Civil Defense, in conjunction with the Headquarters of the United States Air Force, should develop the requirements for civil defense air raid warning and aircraft observers systems. With the assistance of the Air Force they should prepare the necessary operational and training procedures for the use of the Civil Defense Air Raid Warning Chiefs who will be stationed at Air Force Air Defense Control Centers; also, determine the location of aircraft observation posts; prepare instructions, techniques and procedures for organizing and training the volunteer civilian personnel required to serve as aircraft observers.

This Division should be responsible for providing communications facilities for the Air Raid Warning and Aircraft Observers systems. It should furnish technical advice to civil defense organizations and assist in the preparation of pamphlets and instructions for the use of civil defense personnel concerning communications and for the information of the public in civil defense.

The Chiefs of the other divisions in the Office of Civil Defense should be responsible for surveying and determining the communications requirements of their particular specialty. They should consult with, and act on the technical advice of the Communications Chief, regarding methods and techniques to be employed.

The Communications Chief should have broad knowledge of telephone, telegraph, teletype, radio-telephone, municipal signal systems, radio broadcasting and amateurs' radio services. A military background would be helpful in coordinating and integrating the civil defense program with the Armed Services. It is desirable that he have extensive experience in communications systems adaptable and adequate for the needs of civil defense. Similar general qualifications are desirable for the Regional and State Communications Chiefs.

General Communications Branch. It is proposed that an assistant engineer be in charge of the General Communications Branch responsible for planning the general communications systems for civil defense. He would coordinate the communication requirements and services with other divisions in the Office of Civil Defense, the Armed Forces, other government agencies, and the commercial telephone and telegraph companies. He should be responsible for the study and development of technical plans and advice on communications relating to Civil Defense Control Center operations.

Radio Broadcasting and Other Radio Services Branch. It is proposed that an assistant engineer be in charge of a Radio Broadcasting and Other Radio Services Branch. He would be responsible for study and coordinating the utilization by civil defense of the services of radio broadcasting stations and amateur radio operators; furnishing technical advice and assistance to the Police, Fire and Transportation Divisions in regard to

An extract from CIVIL DEFENSE FOR NATIONAL SECURITY—a report to the Secretary of Defense by the Office of Civil Defense Planning, Russell J. Hopley, Director.

the efficient use of communications systems employed by those services.

Air Raid Warning and Aircraft Observers Communications Branch. It is proposed that an assistant engineer be responsible for the engineering, development of tcehnical plans and arrangements for the communications required for air raid warning and aircraft observers systems.

Regional Organization. Whenever Regional Offices of the Office of Civil Defense are established, a representative of the Communications Division should be included on the staff of the Regional Coordinator. He should be responsible for the general supervision and coordination of Civil Defense communications within the region including those required for Civil Defense Air Raid Warning and Aircraft Observers systems. He should serve as the Office of Civil Defense communications liaison with the Armed Forces Signal and Communications representatives in the coterminous area. In time of emergency the organization would be expanded.

State Organization. It is proposed that a Communications Division be established which would be responsible for the necessary surveys, planning and coordination of civil defense communications required for the State operations including Air Raid Warning and Aircraft Observers systems. In an emergency additional personnel would be added as required.

The State Communications Division should work closely with the Communications Divisions in the cities and communities within the State to assist in effectuating the communications plans furnished for guidance by the national organization. These would embrace the various types and arrangements of communications facilities to meet civil defense requirements. The State communications organization should also collaborate with commercial communication companies to provide necessary services.

Local Organization. A Communications Division with necessary personnel as determined locally should be a part of a local Civil Defense organization. This Division would be responsible for coordinating the planning, arrangement and provision of communications required for local Civil Defense. Efficient communications are a primary requirement for the successful operation of control centers and this Division should assist in determining the location of the local control center or centers, based on the availability of adequate and dependable communications facilities at the selected locations. This Division should be responsible for the communications arrangements for air raid warning and for implementing the communications plans made available for guidance by the Office of Civil Defense.

Advisory Staff Panels. The values inherent in consulting with expert and highly experienced personnel in the communications industry, should be utilized by the Office of Civil Defense through the formation of permanent communications and radio broadcasters advisory panels to review at appropriate intervals the objectives of Civil Defense communications planning and the attainment of them. Each member should be qualified in the use of a particular medium of communications. Representation should include the common carrier telephone and telegraph companies, radio broadcasting companies, and amateur radio organizations. Arrangements should be made for appropriate representation by members of the Armed Forces and other interested governmental agencies to attend meetings of the advisory panels. It is also important that the communications chief be represented at advisory panel meetings conducted by the other Civil Defense Divisions, in order that communications matters may be properly coordinated.

The communications chiefs of the state and local organizations should similarly organize advisory committees. Valuable assistance may be obtained from the local telephone and telegraph companies and their cooperation should be solicited.

It is suggested that a joint committee be appointed consisting of representatives of the Armed Forces, of the Office of Civil Defense and selected members of radio broadcasting stations to explore all possible methods that would permit broadcasting stations to remain on the air during emergency periods.

Communications Functions and Operations

Fundamental Requirements. Plans for communications should recognize that targets of the enemy are most likely to be large centers of population and industry, certain dams, power stations, rail yards, bridges, locks, military and other vital establishments; also, that the demand for various categories of communications will be extensive.

To insure the availability, orderly and efficient provision of communications for civil defense, when required, the needs must be envisioned, technical specifications determined, and sound and acceptable plans for guidance formulated in the early stages of Civil Defense planning. During peacetime, to assist in the proper preparation for an emergency, responsible authorities should be made familiar with the requirements for communications systems and procedures. The communications facilities which may be installed initially on a limited basis for civil defense operations should be efficiently flexible to permit rapid expansion as the need arises.

Studies and surveys will be required of the availability and for the proper utilization of various systems of communications. These should embrace common carrier telephone, telegraph, teletypewriter, and radiotelephone services, municipal communications systems, radio broadcasting stations and amateur radio services. Local surveys should include the number of mobile units equipped for one- and two-way radio communications and their frequency assignments; amateur radio; portable transmitter and receiver units for emergency use; and other facilities as may be required locally, such as "walkie-talkies," power sirens, and loudspeaker systems.

Additional facilities should be acquired only with the certainty that existing equipment will not meet requirements. For example, in order to avoid unnecessary depletion of equipment, the warden service should, to the extent practicable, use telephones already available instead of installing special facilities.

Standard telephone and other equipment should be used. This will

avoid delays in procurement and in the installation of equipment, and the need of special training in operational procedures, and obviate problems in the maintenance of the facilities. Standard equipment is generally less expensive, simpler to operate, more readily available and installed than special types of equipment, and requires no unusual training of the maintenance personnel.

Common carrier communications systems should be employed as the basic means of communications, supplemented with radio telephone and other means as studies may indicate are desirable. Definite arrangements should be made with telephone companies for the handling of emergency civil defense calls and to secure uninterrupted availability of telephone services.

Civil Defense Control Centers. Civil Defense state and local control centers are essentially centers of communications for the receipt of air raid warning and other information; for the initiation of action, direction and control of Civil Defense operations during an emergency.

Certain local Civil Defense control centers will function as key point or district air raid warning centers and will be responsible for receiving air raid warning information from the Civil Defense Air Raid Warning Chief and for transmitting such information to other Civil Defense control centers.

Civil Defense control centers will vary in size and scope and more than one center or an alternate center may be established in a city depending upon the size, geography, and other factors pertaining to the community. They should be located with due regard to the ready availability of wire communications facilities, security and dependability of services from the viewpoint of alternate routing of connecting lines, and with capabilities of rapid expansion of the services. Alternate centers, where provided, should be equipped with a minimum of communications facilities necessary to permit its effective operation. They should be properly interconnected for operations during alert periods with skeleton forces prepared for immediate activation in the event the primary center is made inoperative due to sabotage.

Civil Defense local control centers should be equipped with communications facilities for the following purposes:

a. Receipt of air raid warning information.

b. If the control center functions as a key point or district warning center, additional and special facilities will be required including private line network, where necessary, for quickly relaying the air raid warning information to specified air raid warning centers.

c. Local action in informing designated authorities, public utilities, schools, hospitals and the like, of an impending air raid.

d. Operation of sirens, and possibly public address systems to alert and convey other information to the public.

e. Summoning the wardens and emergency groups for duty when needed.

f. Receiving warden reports of sabotage and other incidents.

g. Dispatching appropriate civil defense units for organized assistance.

h. Maintaining contact with Civil Defense Control Centers of neighboring communities to facilitate exchange of assistance.

i. Transmitting messages to the local police and fire departments' wire and radio centers.

j. Communicating with the key radio broadcasting station (a preselected radio broadcasting station which will function as the master station for operational direction and guidance of all other broadcasting stations within a prescribed area).

k. Receipt and transmittal of information involving water supply, chemical defense, public utilities, transportation and evacuation operations.

Provision should be made for the availability of an adequate force of messengers, including Boy Scout organizations, in the event of disruption of normal communications facilities due to sabotage or attack. Arrangements should be made for the allocation in advance of frequencies reexclusively by Civil Defense Control quired for radio channels to be used Centers.

The wardens responsible in a prescribed area should make a survey within their assigned territory and arrange for the use during an emergency of specific telephones on a 24-hours basis for communication with the next higher echelon or the control center as determined locally.

Radio Broadcasting

Radio broadcasting stations (standard band Amplitude Modulation (AM), Frequency Modulation (FM), Television (TV), and Facsimile (FX) can be used to advantage by civil defense and should be utilized as an important medium to inform the public as to its responsibility in civil defense. In the event of emergency the broadcasting of appropriate warning and other information can contribute immeasurably to the maintenance of morale and prevention of panic. It should be recognized that for radio broacasting stations to serve the needs of civil defense effectively it is essential that they remain on the air attack, during air raids, and in the post raid periods.

In anticipating possible enemy military action within any section of the United States, such as limited scale airborne drop to destroy vital installations, the Office of Civil Defense, in conjunction with the Armed Forces, should determine the extent, if any, and the manner in which the civil defense proram should envision the use of radio broadcasting stations, in directing the conduct of civilians and warning against misleading reports broadcast by the enemy.

Use of Radio Broadcasting Stations to Educate the Public. Civil Defense operations will, of necessity, be centered around communities, the utilization of volunteers and the basic principle of selfhelp, neighborly and community assistance. The public should know what they should do in an emergency. This is one of the important responsibilities of the Office of Civil Defense and obviously will involve a major educational program and require a well integrated system for the dissemination of information. The radio broacasting stations can be employed as a valuable medium for this purpose. In the United States, radio broadcasting stations are acknowledged generally to be a most effective means for widespread education of the public, since their services assume comprehensive coverage in a minimum of time.

With a properly planned and coordinated civil defense program for the broadcasting stations, civil defense educational material could be quickly presented to a maximum audience with a minimum number of persons required to prepare and disseminate the information.

Broadcasting Before an Air Raid. The morale value inherent in radio broadcasting of authentic information has been proved many times during disasters such as floods and fires, but has never been established under enemy attack in this country.

On the assumption that broadcasting stations will be able to operate under appropriate security measures, they can perform vital services before an air raid, such as warning the public of impending air attack, mobilizing civil defense workers and the

citizenry itself, in the early stage of emergency. Bulletins could be broadcast regarding the location of shelters, advice given pertaining to conditions which might lead to jamming of thoroughfares; neighboring communities could be called upon and civil population requested to stand by for aid in the event of need after the attack.

In an emergency all possible conditions cannot be foreseen. Civil defense plans should, therefore, comprehend the establishment during emergency of a single appropriate source, preferably in the local Civil Defense organization, for broadcasters to consult for specific instructions concerning conditions induced by the attack.

Broadcasting During and After an Air Raid. Positive assistance can be rendered to civil defense by broadcasting stations during and immediately following an attack. If the attack should be atomic the public must be encouraged to steel itself against the tremendous shock of surveying the damage, the loss of life, and the casualties which will inevitably ensue. During this period of shock, it is almost certain that the public will come closest to mass hysteria. Broadcasting stations through proper programing and dissemination of reliable information may perform a service unavailable by any other means. They could assist, under the direction of Civil Defense, to:

a. Reassure the civilian population.

b. Inform Civil Defense workers of developments by broadcasting bulletins authorized by Civil Defense.

c. Assist in mobilizing, through its facilities, fire-fighters, police, and other services.

d. Prepare those who have taken shelter for the emergencies they must face when the all-clear signal is sounded, giving them instructions on assembly points to which they should proceed, emphasizing the need for orderly conduct and describing the Civil Defense services which will be available to restore the community to as normal a condition as possible.

e. Inform the public of those areas which should be avoided because of radiological or other contamination.

f. Give instructions on the use of water and other utilities in the home and in other locations after the attack.

g. Warn vehicular traffic approachinf the damaged area to stay clear (the great majority of vehicles now have radio receiver installations).

h. Mobilize assistance from adjacent communities unaffected by the raid.

i. Assist through announcements and programs in re-establishing as much as possible the even tenor of community life.

Radio broadcasting station facilities could be made available to Civil Defense, military and municipal officers that they might directly address the people on the conditions in the emergency which might bring to the nation messages calculated to reassure the public.

Service for Separated Persons. Broadcasting stations, properly organized could in time of emergency transmit personal messages involving certain family members in offices and others remotely located in surburban areas at the time of an attack. Much panic could be avoided if the two separated groups could be assured as to the safety of the others, thus aiding civilian morale immeasurably. Such advice has been performed by broadcasting stations many times during a domestic disaster. Extreme care, however, will be necessary in the examination of the source of such messages before broadcast.

Key Radio Broadcast Stations. The Civil Defense Air Raid Warning Plan contemplates the designation of key radio broadcasting station or stations throughout the nation, which will serve as master stations for operational guidance of all other radio broadcasting stations within the area. Separate instructions will apply to the more than thirty international short wave broadcasting stations.

A channel of communication would be established from local Civil Defense Control Centers to the key radio broadcasting station or stations, for transmitting information and instructions. Under this arrangement, key radio broadcasting stations would accept information and instructions only from such authorities as the Civil Defense Air Raid Warning chiefs and the local Civil Defense Control Centers. Other radio broadcasting stations which would become satellites in emergency conditions would, by direct line connection or monitoring of a special carrier or by other means, be in constant touch with the key radio station, ever prepared to hear any signal which would indicate impending attack and the prescribed action to be taken by them. Only in the event of proper codified instruction to the satellite radio broadcasting stations would they join with the key radio stations in broadcasting of Civil Defense information to the listening public.

Television Broadcasting Stations. Television broadcasting stations provide for Civil Defense an excellent means for educating the public and conveying pertinent information through the simultaneous presentation of video as well as audio messages. Television has flexibility, permits prompt revision of information as an emergency situation changes, maintains accuracy of information by the simultaneous presentation to all users without deterioration which may occur when data are passed through several hands.

During World War II, television proved a great aid to civilian defense authorities in cities where stations were operated and in many instances personnel were trained through television broadcasts. Through the preparation of training film by the Office of Civil Defense, television could be arranged for various demonstrations such as the use of gas masks. Television is expanding across the nation. It may, therefore, reasonably be expected that a great many people will be reached through this medium. The Office of Civil Defense should keep informed as to new devices or applications of television which may be developed.

Dependability of Operation of Broadcasting Stations. In metropolitan areas and in many of the smaller communities broadcasting station transmitters are located at some distance beyond the populated section of the community. Most of them are so equipped that should there be an attack or sabotage which would destroy their centrally located studios these could continue on the air from the transmitter quarters on an emergency basis.

Amateur Radio. Emergency service is a tradition in amateur radio operations. The amateurs' record during peacetime disaster indicates they are resourceful, adept at improvisation and possess a high sense of community service. They are licensed radio operators owning their own portable radio telephone and telegraph equipment, thus providing for maximum flexibility. Under a carefully organized plan they are capable of making an important contribution to civil defense in providing supplementary emergency communications channels, especially during a post-raid period. The Office of Civil Defense should initiate study with a view to integrating the civil defense program with the Army and Air Force for the utilization of the amateurs' services.

COMMUNISM—WHAT IS IT?

Recently, according to Ordnance magazine, a Congressional sub-committee in its report about Soviet and Communistic tactics, stated ten fundamental conclusions:

1. The Communists have one goal —world revolution.

2. They assume that the revolution will be violent.

3. They are incapable of accepting the idea that peace can endure from now on, and they expect one more catastrophic war.

4. The Soviet Union is regarded as the main force of the revolution.

5. They fear a coalition against the Soviet Union.

6. They therefore fear reconstruction or federation in the non-Communist world.

7. They utilize the most modern and effective means of cold warfare to strengthen their own forces and to weaken all others.

8. The Communist parties outside the Soviet Union are junior partners or auxiliaries.

9. The tactics are based upon a definite theory, and the central propositions of that theory do not change.

10. The division of Europe and Asia between the victors of World War II is to be settled by power politics and not by negotiation.

A well-informed soldier is the best soldier. One of the earliest army directives requiring that all officers and enlisted men know the reasons for all military activities, was issued in army maneuvers in 1935 when all unit commanders were directed to brief all men on the situation, both enemy and friendly, and to explain as far as possible what had been accomplished and what was planned. That idea has been developed through current "Armed Forces Talk," which is distributed weekly for the use of commanders conducting organized discussions among their personnel. Following are extracts from a recent issue on Communism. [*Ed. Note.*]

A theory of government has grown up in the world which is opposed to our democratic way of life. Because there are those who would like to put it into practice in the United States, it is important that we understand what it is and how it works. This theory of government is known as *communism.*

The long-range aim of communism in the United States is to seize control of the existing Government by penetration and infiltration—by force if necessary—to set up a dictatorship by the Communist Party, with the avowed ultimate aim of making the United States part of a stateless world society having common ownership and common operation of the means of production. To implement this aim, Communists in America pledge their loyalty to a world Communist movement.

Communism has meant various things throughout history, but modern communism is based on the *Communist Manifesto* issued by Marx and Engels in 1848, which emphasizes the necessity for forcible seizure of government.

The greatest apostle of Marx and Engels in recent times was Lenin, who is worshipped by Communists everywhere as the father of the Soviet State. Because of him, modern communism is sometimes called Leninism, or Bolshevism, the latter after the Russian party he led.

The Manifesto stated, "The Communists . . . declare that their ends can be attained only by the forcible overthrow of all existing social conditions," but modern Communists recommend more subtle techniques, reserving violence as a last resort. However, the extent of the violence to which the Communists are willing to go is found in their recommending a "temporary" destruction of the production forces, and to cause the sacrifice of an entire generation.

The Communists, following Marx-Lenin doctrines, state that the capitalists (employers) and the proletariat (workers) are natural enemies. A constant struggle between these two groups, they say, is unavoidable. They contend that the "masses" are the real strength of society and therefore must eventually rise to take over the state. (Lenin said the state could be seized only by bloody revolution, but modern communist tactics rest heavily on penetration and infiltration as means of seizing a government.) After seizure of the government the "dictatorship of the proletariat" comes in. This period, say the Communists, is to be a "transitional" and temporary period, during which democracy cannot be practiced because of the possibility of counter-revolution and because the workers in general are not immediately capable of self-rule. Accordingly, the Communists maintain that the masses must be ruled by an "enlightened few," who are, of course, the Communists.

The Russian Bolshevist Revolution of 1917 was the first example of a political party based on Communist theory succeeding in forcibly seizing a government. This party, later called the Community Party, came to dominate completely the government and all phases of Russian life, and proceeded to attempt to put their theories into practice. *But the dictatorship by the party shortly became transformed into a dictatorship by high party leaders.* These leaders have not claimed that communism was or is established in the Soviet Union. Their "transitional" dictatorship is still in effect after 30 years. The party now has 6 million members out of a population of 192 million, or approximately 3 percent of the present population of the Soviet Union.

A fundamental principle of communism, as stated by Lenin, and the most extensively developed idea of Communists, is that "The support of Soviet Russia is the duty of Communists in all countries." The Communist Party in America has followed this policy. In almost every instance, on local, national, or international issues, they support whatever side most favors Soviet interests. This is the main feature of the Party Line.

The smallest unit of the Communist Party in Ameria is a squad—which has from 3 to 10 members. A number of squads are organized into a group. A number of groups form a section, and over these are county, State, and district organizations, over which is the National Committee of the Party, with headquarters in New York City.

In the planning and operation of party activities, each unit sends one or more members to meetings of the next higher level. The national headquarters also keeps close control over all lower units by sending representatives to direct their work.

Party members fall into two distinct groups. In the first are people who publicly admit they are Communists. Among these are officials in higher levels of the party. The other group includes secret members, persons who deny any connection with the party and who take pains not to become publicly associated with people who admit Party membership.

The *Daily Worker*, a newspaper headed by a member of the national board of the Communist Party, states that the Communist Party in the United States had 74,000 members on its rolls. J. Edgar Hoover, in his testimony before a congressional committee stated: "It is well known that there are many actual members who because of their position are not carried on the Party rolls. . . . What is important is the claim of the Communists themselves that for every Party member there are 10 others ready, willing, and able to do the Party's work. Herein lies the greatest menace of Communism. For these are the people who infiltrate and corrupt various spheres of American life. So, rather than the size of the Communist Party, the way to weigh its true importance is by testing its influence, its ability to infiltrate."

Communists always have believed that a valuable method of reaching their goal is to penetrate existing governments so that communist action can attack from the inside as well as from the outside. This is called "boring from within."

The Communists have always used front organizations, which are considered good Leninist tactics. This consists of creating many new organizations, and infiltrating existing ones, to support Communist aims.

A front organization is one that does not advertise itself as Communist. Instead, its title usually expresses an idea that is the opposite of communism. Often a front organization is set up to attract public interest for or against some current issue. The organization disbands when the issue is no longer important. Other front organizations work for more permanent issues, although these groups often change their titles to meet changing conditions or shifts in public opinion. For example, one front organization, the *American Peace Mobilization*, made a quick name - change to the *American People's Mobilization* after Germany attacked Russia in 1941.

The purposes of front organizations are to spread Communist ideas, and to promote the interests of the Soviet Union in the United States and elsewhere. Front groups are effective because they often enlist the support of Americans who would not knowingly support a group identified as Communist. Many genuinely non-Communist Americans have permitted their names to be used by such organizations without first determining what purposes lay behind the high-sounding titles.

Some groups which before the war publicly identified themselves as Communist are now operating as front organizations. One example of such a group is the *American Youth for Democracy*. One day in 1943, the *Young Communist League* was dissolved. The next day, *American Youth for Democracy* was founded. At first Communists denied that the new group was a Communist organization. But in April 1946 the Communist Party indicated that *American Youth for Democracy* is the *Young Communist League* under a different name.

Communists employ both open and disguised propaganda. Open propaganda, such as Party newspapers and other publications, is aimed at people already enrolled in the Communist cause. The majority of Americans rarely have direct contact with this type of propaganda. The disguised propaganda is aimed at anybody who will listen, look, or read.

Because liberal ideas have an honorable tradition in American progress, Communists attempt to be identified in the public mind as supporters of liberal causes. In this way they believe that sincere liberals may be tricked into supporting Communist interests. By supporting things which many good Americans believe would make democracy work better, Communists hope to create a general feeling that communism and democracy are pretty much the same thing. In reality, Communists look upon our democracy as impractical, imperialistic, fascist.

The Communist strategy of forcible seizure of government has always contained clear and specific instructions concerning military and police organizations. Lenin singled them out in his orders concerning illegal work. He stated: "Illegal work is particularly necessary in the Army, the Navy, and police. . ." Communists are taught that the security organizations must either be destroyed or their loyalty weakened before any Communist revolt can be successful. They believe that if the Army can be deceived into taking the Communists' side, the revolution is certain to succeed.

These ideas explain the changes in the Party Line regarding the Armed Forces that have occurred between 1939 and the present time.

The individual American can do much to protect America against communism. No American who has a habit of thinking clearly is likely to lend his support to activities that help the Communist cause. The alert American will not swallow hidden or open propaganda. He does not sign up with front organizations. He does not let Communists trick him into the foolish position of opposing everything the Communists publicly support. For example, Communists say they are for a higher standard of living. So is every good American.

The individual soldier, sailor, airman or marine has a duty to be especially alert to any subversive activity —communism comes within this category. This does not mean appointing himself as a one-man counterintelligence division. It doesn't mean that a man should take on personally anyone he suspects of Communist tendencies. Every military man just as every other American citizen, should report evident disloyalty or subversion to proper authority. We must not report to the CO everyone who disagrees with the majority view on a public issue. Free discussion of every such issue is an American tradition, and only the person who has given real evidence of disloyalty should be reported.

Some Americans pin the Communist label on anybody who disagrees with them. J. Edgar Hoover recently gave some excellent advice about this practice. He said, "I have always entertained the view that few names are more degrading than 'Communist' and hence it should be reserved for people justly deserving the degradation."

More effective than panic and name-calling is vigorous, intelligent watchfulness. Communists dread this. It explains why they direct their bitterest attacks against our Government agencies responsible for our Nation's security.

The most effective defense against communism is a strong working democracy that preserves and guarantees the freedom expressed in our Constitution and laws. Communists are a menace to that freedom in the same way that disease can become epidemic, spreading from a few to many people. And, like a disease, communism requires a quarantine to keep it from infecting the Nation. The best quarantine against communism is a permanent one—vigilant, positive democracy.

NEWS—SERVICES and INDUSTRY

General

Henderson Leaves NSRB

Fred E. Henderson, who has been serving in key posts with the National Security Resources Board since Feb. 15, has returned to the Western Electric Co. as Superintendent of Cable Manufacture at the Point Breeze, Md., Works. He gained for his NSRB service high commendation from Chairman Arthur M. Hill and Director of Production S. E. Felton. Mr. Henderson will be available as a consultant to the NSRB on call, and he is also taking part with an address on industrial plant dispersion at the orientation conference being staged in mid-November at the invitation of Secretary of Defense Forrestal.

Mr. Henderson, who was superintendent of the telephone apparatus shop at the Point Breeze Works before he came to the NSRB, served from Feb. 15 to Sept. 1 in charge of the planning of strategic relocation of industry and government agencies and as a result of his program it is felt that the NSRB has now become the outstanding authority in this field of governmental and industrial relocation and dispersion. From Sept. 1 he served as Deputy Director of its Office of Production, and his organizing ability brought about largely the staffing of the production units with outstanding industry executives.

NSRB Industry Committees

The work of the National Security Resources Board's industry task committees has been blazing the trail of the new planning on high priority materials, manpower, and overall armed services' procurement requirements. Each industry unit in the Production Office is now headed by a topflight executive from that industry. In order to decentralize and to save time of military contractors the NSRB is now considering the establishment of regional field offices which would service in the field all requirements on scarce materials and components, manpower and contract difficulties.

In the communications field, Assistant Director of Production L. H. Peebles, who has been a mainspring in the aim of industry cooperation, is now interviewing possible appointees for the top post and operating branch chieftainship in the NSRB Communications Division from the two segments of the telephone industry. The electronics manufacturing industry task committee has completed a very comprehensive report on mobilization production coordination, a projected single control-limitation order plan, and a suggested organization of a "M-Day" agency. The size of the proposed Telephone-Telegraph Operating Industry Advisory Committee has held up that body's final selection.

Research Board Chairman

The resignation of Dr. Vannevar Bush from the chairmanship of the Research and Development Board of the National Military Establishment is a great loss to the national defense preparedness effort. Fortunately he is being succeeded by one of America's most able scientists and administrators, Dr. Karl T. Compton, who retired as president of the Massachusetts Institute of Technology to head the R & D Board. Dr. Bush directed the government's scientific policies and research and development activities in the entire World War II period since 1940. He asked to resign so that he could devote himself principally to the presidency of the Carnegie Institution of Washington. His resignation became effective October 14th.

Dr. Compton, one of the nation's outstanding physicists, served with Dr. Bush in the front line of scientific endeavors during the war years as chief of the field service of the Office of Scientific Research and Development, predecessor of the present board.

In World War I, Dr. Compton served with the Army Signal Corps, specializing in the development of submarine detection devices.

It was Dr. Compton's task in World War II to round up qualified "combat" scientists for handling spot problems in the theaters of war. A colleague summed up his ability this way: "He gets things cooking in short order." As a scientist, Dr. Compton contributed to the development of radar, the atom bomb, synthetic rubber, and other wartime products. He has demonstrated his understanding of our country's needs in the current critical situation by speaking out vigorously for universal military service, for the Marshall plan, and for freedom of scientists from Congressional committee investigations.

AFCA Members See Showing Of Ultrafax

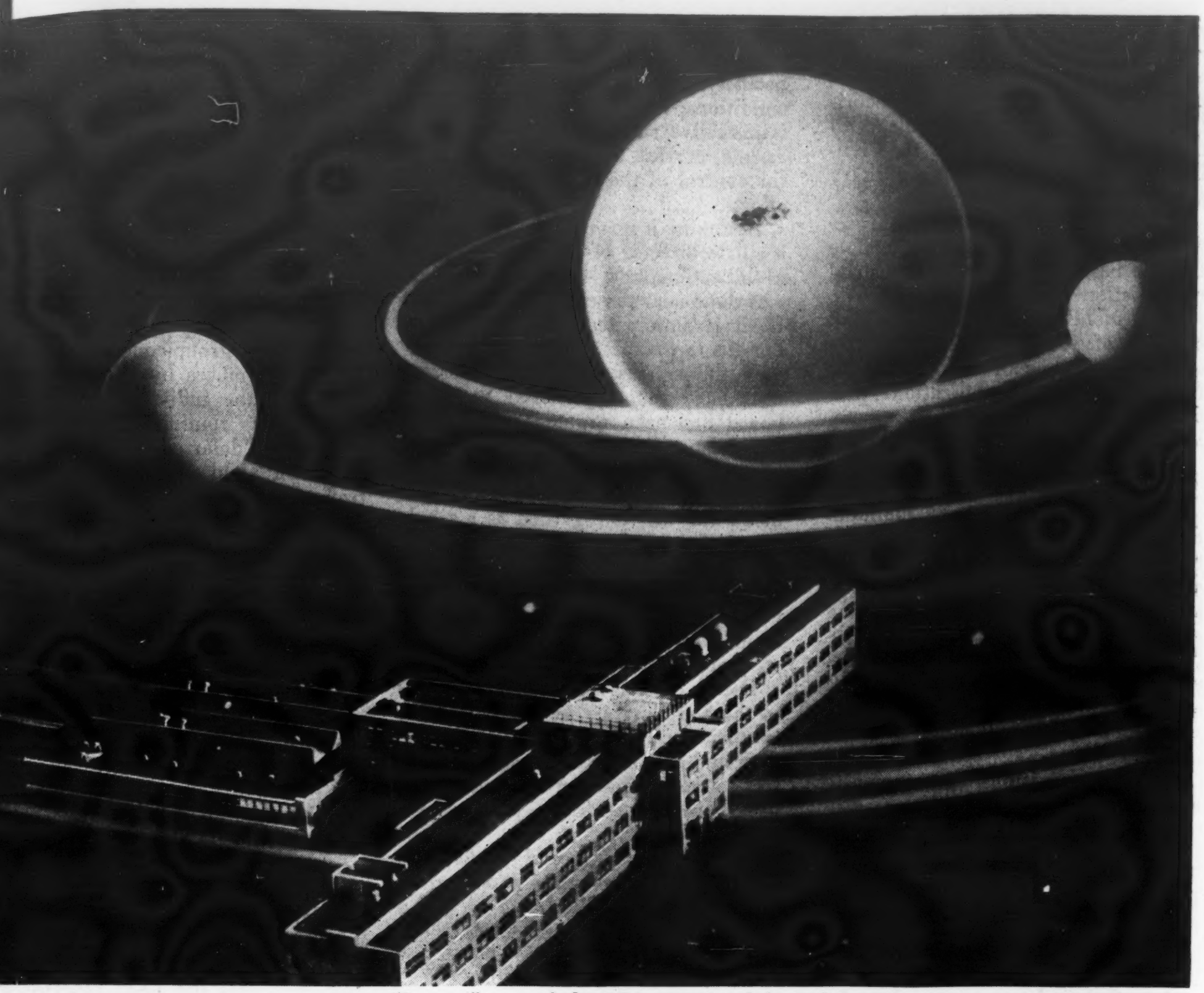
The first public showing of the latest development in high-speed communications was held in the Library of Congress at 11:00 A.M. on October 21, 1948, when the Ultrafax system was demonstrated. Capable of transmitting and receiving a million words a minute, the system was developed by the Radio Corporation of America in collaboration with the Eastman Kodak Company—both of which are charter group members of AFCA.

Top level communication personnel of the Armed Forces, including the Chief Signal Officer of the Army, Major General Spencer B. Akin, with Colonel E. R. Petzing, head of Research and Development, the Director of Air Communications, Major General F. L. Ankenbrandt, and Major General H. M. McClelland, Deputy Commander of MATS. And representatives of the Chief of Naval Communications and Naval Development Laboratories. Also present were Colonel W. W. Watts, president of AFCA's Philadelphia chapter, Orrin Dunlap, AFCA's advisor on publicity, and A. K. Mitchell, vice president of the Washington chapter, and other leading figures in civilian communications in Washington and from communication centers elsewhere.

NSRB Functions

Functions and activities of the National Security Resources Board were recently described in the New York *Times* and in U. S. *Naval Institute Proceedings*. These accounts state that the NSRB has been organized to meet not only the requirements of the present "preparedness" situation but also those of a possible wartime emergency.

In addition to the administrative staff of NSRB there are three staff agencies. One of these, headed by a director of plans and programs, is charged with developing the broad strategy of economic mobilization



"Sunspot" research, by RCA engineers, helps radio communications to dodge interference from magnetic storms. RCA Laboratories is a center of radio and electronic research.

93,000,000 miles of laboratory space

cyclonic spot erupts on the face the sun, and—here on earth—we el it. Sunspots cause "magnetic orms," which disrupt radio com-unications.

What can be done about it? Re-arch, during which RCA scientists d engineers "worked" by instrument the sun—93,000,000 miles away—ers an answer.

For many years, science related gnetic storms to sunspots. An curate way of forecasting these turbances was needed.

RCA scientists took a new tack. They noted that interference was most intense when sunspots were in a certain "critical area." Location and activity were observed to be more important than size.

Using this knowledge, RCA communications engineers accurately forecast the beginning and end of magnetic storms. They have established a daily magnetic storm forecasting service which is distributed like weather reports throughout the world. Transmission of messages can be arranged over circuits or paths that will dodge interference.

Such a pioneering spirit in research gives efficiency of service and leadership to all products and services bearing the names RCA, and RCA Victor.

• • •

When in Radio City, New York, you are cordially invited to see the radio, television and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. Radio Corporation of America, RCA Building, Radio City, N. Y. 20.

RCA **RADIO CORPORATION of AMERICA**

planning, integrating national security programs, so far as possible, with the productive capacity of the civilian economy, and balancing military and civilian requirements.

The director of mobilization procedures and organization is responsible for the basic ideas of the industrial mobilization plan itself.

The mobilization planning staff consists of four divisions, each responsible for one of the four major fields of industrial mobilization—production, transportation, and economic stabilization.

Correspond to War Agencies

These four divisions will maintain direct contact between the mobilization planners and the civilian economy. They will develop the detailed plans in specific fields for balancing requirements among the various military and civilian claimants, fitting requirements to resources, maintaining stockpiles and stand-by plants, developing new sources of supply and so on.

The four divisions correspond to some extent to four major war agencies of World War II—the War Production Board, the Office of Defense Transportation, the War Manpower Board and the Office of Price Administration.

Under mobilization or wartime conditions, each of the four divisions is intended to become a nucleus for a new war agency. For example, the production division could be quickly transformed into an Office of War Production except for its food group, which would go under the Department of Agriculture.

The economic stabilization division dealing with rationing, price and wage controls, tax and fiscal policies, etc., would serve as the nucleus for a wartime Office of Economic Stabilization.

It would have a foreign economics division which in case of war would become a nucleus for an Office of Economic Warfare.

The transportation division would form a wartime nucleus for an Office of War Transportation except for ocean transportation which would come under a Maritime Commission.

Coordinating Agency

The manpower division would become an Office of War Manpower except for sections now handling medical services, housing and community facilities and activities, which might go under other governmental departments or become separate agencies.

If the mobilization planning staff was thus separated from the National Security Resources Board under war conditions, the board and its top administrative staff would be available as the central coordinating agency for control of the entire civilian war effort.

Assuming it was decided to appoint a single director of an Office of War Mobilization and Reconversion, as was done near the end of World War II, it is anticipated that the present board's top administrative staff could form the nucleus of the OWMR staff.

It has been emphasized that the board has been organized for present and possible future activity largely on the basis of World War II experience and analysis. This does not mean that this is regarded as a rigid form of organization. On the contrary, it is regarded as a starting point, which can be modified quickly to meet changing conditions and as a framework which can be expanded in case of emergency.

Board officials consider it unwise to think exclusively in terms of final blueprints. They want flexible planning and also a flexible structure subject to rebuilding and modernization in accordance with the progress of planning itself.

(*Editor's note: Special emphasis is being given to communications problems by the special advisor on communications, Mr. Leighton H. Peebles.*)

Communications Symposium

The Research and Development Board of the National Military Establishment held a symposium on communications research at the Department of Commerce auditorium in mid-October.

The three-day meeting was regarded as being of tremendous value to the Research and Development Board and is expected to have far-reaching effect on new equipment for the armed forces.

Members desiring a report in detail on this meeting should submit their requests to the national headquarters of AFCA.

81-C-1 Teletype System

Development is now practically completed on the 81-C-1 teletypewriter switching system, with over-all systems tests finished and the test setup in the telegraph laboratory in Graybar-Varick now being used for demonstration. The first working system, one for Pan American Airways, is currently scheduled for completion in October; one for General Motors in November; and one for Eastern Airlines early next year.

Designed for more than one switching office, the new system is in other respects an enlargement and improvement of the system installed for Republic Steel in 1941. As installed for Pan American the new system will have three switching offices, and for Eastern Airlines, two. It also permits multi-address messages to be sent to all offices, or to prearranged groups by a single group-code; or to any number of offices by using address-codes for the individual offices. It also permits routine messages to be classed as "deferred," in which case they will yield precedence to other traffic. Even if three switches are made, the receiving machine will start within a matter of seconds after the original tape is started through the transmitter, provided an idle path is available. At peak load periods, a delay of only a minute or two is usually enough to secure an idle path.

As in the 81-B-1 system, the switching office will query each station on a line in rotation for inward traffic. An improvement over the early system is the provision of full selective calling when several stations are connected to the same line. In addition, there is a simple and inexpensive system available for nearby stations which are connected to the switching center over individual lines. The new system also uses the 14-D reperforator transmitter unit previously described by Ross A. Lake of Teletype Corporation.

Bell Laboratories Record.

Quartz Crystals Grown in Lab

Clear, sparkling crystals of real quartz, identical in every way to those produced only by the processes of nature, now are being grown inside bomb-like steel "test tubes" at Bell Telephone Laboratories according to a paper by Ernest Buehler and Alfred C. Walker, presented at a meeting of the International Union of Crystallography at Harvard University, Cambridge, Mass. Recent experiments have been so successful that commercial manufacture of the mineral seems possible for the near future.

From a small seed plate, suspended in a specially constructed bomb and subjected to pressures exceeding 15,000 pounds per square inch and to a temperature of 750 degrees Fahrenheit, a clear crystal more than an inch long may be grown in a month.

The material from which the quartz crystals are grown is a finely powdered form of silica, a common chemical compound which looks something like granulated sugar. This is placed in the bottom of the steel bomb and an aqueous alkaline solution is added. The seed plate, a thin wafer of quartz, is suspended at the top of the bomb; the bomb then is sealed and placed in a furnace. The silica dissolves and rises to the cooler part of the bomb, and is deposited on the seed plate in perfectly regular order until all of it is in the form of a single clear crystal.

Kellogg Cited for Vet Hire

The Kellogg Switchboard & Supply Co., Chicago, was recently presented a citation by Mayor Martin Kennelly in recognition of the company's record of hiring war veterans.

The ceremony, part of the National Employ the Physically Handicapped Week (Oct. 3 to 9), marked the Kellogg company as one of 15 outstanding major industrial plants throughout Illinois to win recognition in giving employment preference to disabled veterans.

About 10 percent of the Kellogg company's total of employed veterans are handicapped veterans. Thirty-six percent of Kellogg's male employees are veterans.

Tech Schools Offer Plan

Several private technical schools, who are group members of our association, have announced their readiness to study the desirability of their utilization to provide facilities for training technical specialists for military communications, as was done in World War II. Such a plan might be in effect during the current draft or in case of emergency, if required by the Armed Forces.

Pay Increases Endorsed

Mention was made in the columns of SIGNALS in September of the vital need for pay increases for those in the higher brackets in the Services. The Reserve Officers Association, at a meeting in Washington in September is urging Congress to revise the pay scale. The ROA urged the restoration of the $1,500 tax exemption for Service salaries which had been in effect during World War II.

Comdr. John P. Bracken, in asking endorsement for pay increases, said many officers of the Army, Navy, and Air Force are leaving the Services for private industry "so they can make a living."

"There have been no real pay raises for the Armed Forces since 1908," he said, pointing out that living costs are many times what they were when basic pay scales were established 40 years ago.

The $1,500 Service Pay income tax exemption went into effect in 1942, but lapsed this year.

Benefits for RCA Servicemen

All employees of the Radio Corporation of America and its subsidiaries, of six months or more standing, who enter the armed forces of the United States under the Selective Service Act of 1948, will be paid the difference between their base pay for their last month of employment and what they receive for their first month's military service, it was announced today by Brig. General

(*Continued on page* 54)

COMBAT TESTED...STILL ON DUTY...

these unusual batteries that are sealed in steel

You and millions of other veterans learned during the war that you could rely on Ray-O-Vac LEAK PROOF Batteries. In all climates, on all continents, they stayed *fresh* in storage—came through famously under the hardest usage.

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For light, power, ignition—any dry battery need—there's a reliable Ray-O-Vac product. If you have any special battery problems, our laboratory can help you solve them. The Ray-O-Vac Company, Madison 10, Wis.

★ **Sealed in steel and protected by nine layers of insulation, to keep power in and trouble out.**



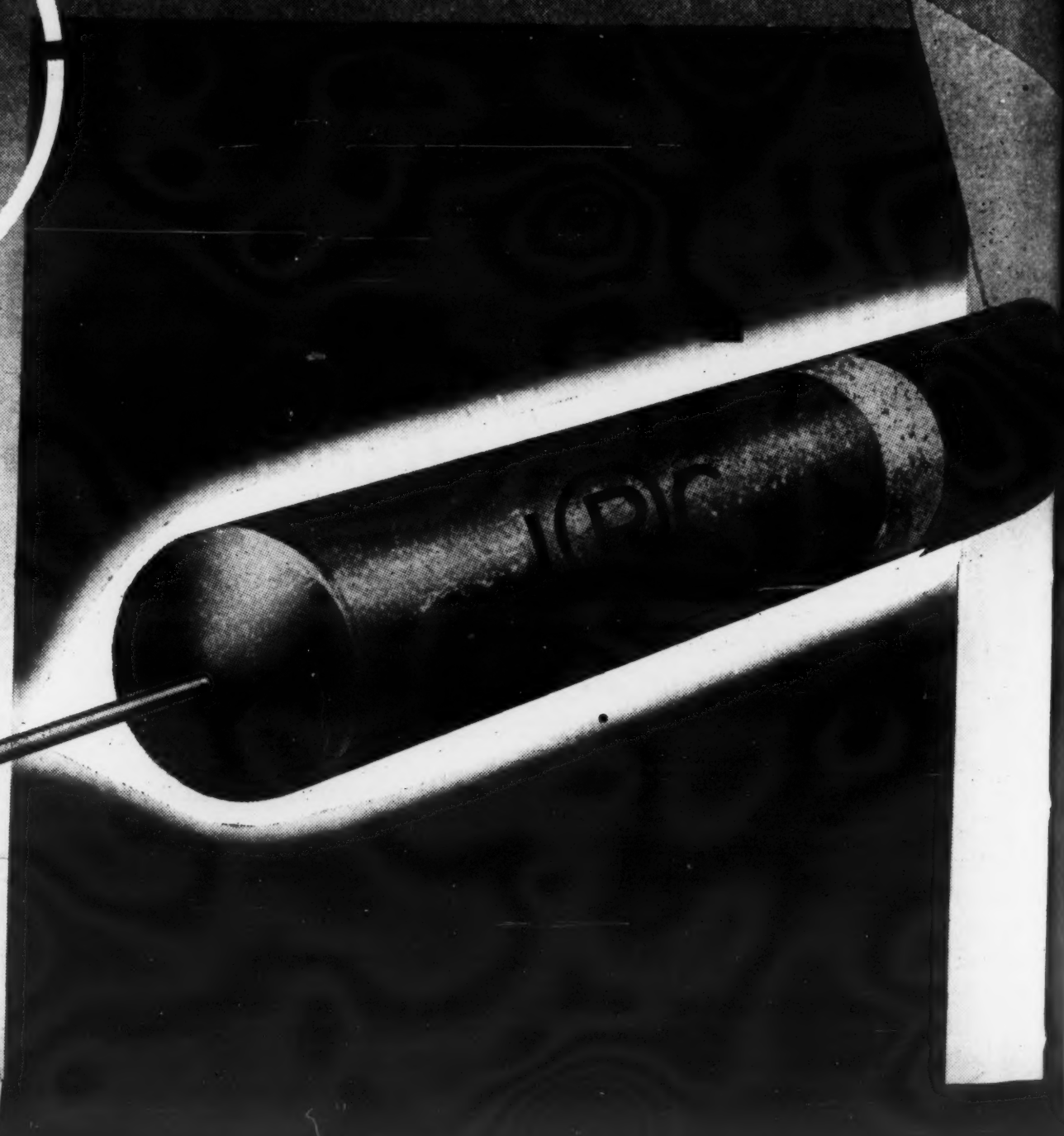
THIS GUARANTEE is printed on every battery: If your flashlight is damaged by corrosion, leakage, or swelling of this battery, send it to us with the batteries and we will give you FREE a new, comparable flashlight with batteries.

SPECIFY RAY-O-VAC LEAK PROOFS, AND BUY SPARES...THEY STAY FRESH

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IRC MEETS JAN-R-11

IRC SURPASSES JAN-R-11

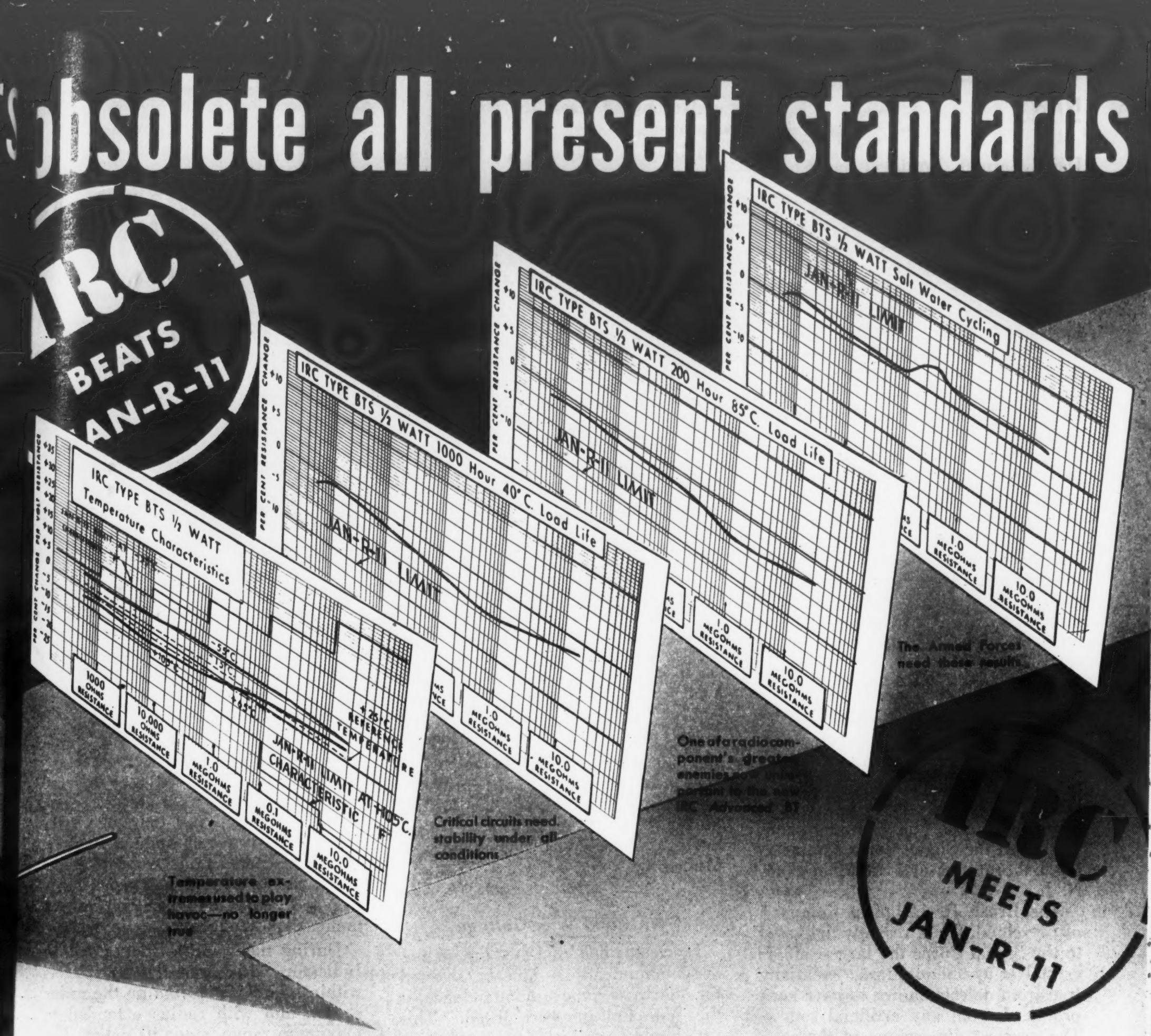


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David Sarnoff, President and Chairman of the Board of RCA.

This payment will be made, General Sarnoff said, whether the employee is called or volunteers for service in the armed forces. In addition to all other rights and privileges to be provided by RCA under the Selective Service Act, he continued, the corporation will continue in force for 31 days the employee's group life insurance. RCA will pay the full premium, including the employee's portion.

RCA also will pay to those who may enter the armed forces an amount equal to one year's premium on an equivalent amount of life insurance under the National Service Life Insurance Act, but not exceeding the maximum amount provided under the act. This will be done upon submission to RCA of evidence that application has been made for such insurance.

Synthetic Quartz

Quartz, one of the most common of solid minerals and essential in the manufacture of efficient radio apparatus, has been produced synthetically in high grade quality under sponsorship of the Signal Corps Engineering Laboratories at Fort Monmouth, N. J.

The Brush Development Company of Cleveland, Ohio, recently delivered to the Signal Corps the largest single crystal of synthetic quartz essentially free from defects known to have been produced from any artificial source. The greatest dimensions of the sample are equal to the diameter of a silver dollar.

Since it was demonstrated in 1921 that a radio oscillator could be made stable by the use of a slice of crystalline quartz, the demand for this mineral has increased with the growth of the use of radio. Its importance can best be appreciated by the fact that in 1932 the United States imported 374 pounds at an average price of $.23 per pound. Ten years later, it was importing 3,356,000 pounds with the price rising with its increasing importance to an average of about $6.00 per pound at the close of the war.

Quartz crystals are grown by deposition from a solution containing the raw material derived from quartz-sand or other silica materials, in a closed metallic container at a temperature of about 750F, or about three and one-half times boiling water, and at pressures as high as several thousand times that of the atmosphere.

Individual molecules are deposited on a seed crystals in a regular manner to produce a larger outward geometric expression of the inner structure of the original seed. As long as there is a supply of the material in solution greater than it can hold, the surplus material under controlled conditions of pressure and temperature will deposit layer on layer in a regular manner to build up the final crystalline form, much as building blocks are used to make various rectangular structures.

It is believed that mass production of synthetic quartz crystals may be feasible but considerable laboratory investigation must be made before they can be manufactured on an economical basis. It is not inconceivable that synthetic quartz crystals can compete with the natural product once optimum manufacturing procedures have been established.

Sharing in the success of the Signal Corps Engineering Laboratories program and sponsored by them through research contracts are the Brush Development Company of Cleveland, Ohio; Baird Associates of Cambridge Mass.; the Edward Washken Laboratories of Cambridge, Mass.; Antioch College, Yellow Springs, Ohio, and the University of Minnesota.

National War College

In September SIGNALS the names of communications officers selected for the high honor of attendance at the War College were listed. This list should have included, in addition to Colonel R. C. Maude, the names of Colonel Thomas L. Bryan, Jr., and Colonel Donald P. Graul, both of the Air Force.

AIR FORCE

Electronics Stressed in Spaatz Report

In his final report as chief of staff of the United States Air Force, General Spaatz emphasized the importance of electronics. General Spaatz had this to say about this vital phase of air operations:

Since V-J Day much progress in research and development has been made in electronics, and many wartime developments have been revealed for the first time. The general fields in which this progress has been made are the following:

Airborne radar: A high-precision airborne radar system now available for operational use povides a means of precision navigation and accurate bombing through overcast. Also under development are airborne gun-laying and air-ranging equipments to cope with aerial gunnery problems of combat at high speeds and altitudes and against even smaller targets and at greater ranges than before. By means of this equipment accurate range and position information enable fire to be directed upon enemy aircraft and ground targets invisible by direct vision.

Ground radar: Ground radar was first extensively used in England at the beginning of the war to warn of the approach of the Luftwaffe. This early equipment employed relatively long wave lengths that provided accurate range but only crude direction and elevation. As a result, while the distance of the attacking formation could be closely determined, only approximate data on the number of aircraft involved could be obtained.

"Intense development work initiated during the war produced equipment operating in the microwave region. At this short wave length it became possible to distinguish individual aircraft flying only one mile apart. Microwave equipment also enabled the detection of low-flying planes as far away as the visual horizon and removed a serious flaw of the earlier long-wave equipment.

During the war the Plan Position Indicator, which revealed all targets within a circle centering on the radar station and with radius extended to maximum range, made its debut. The operator was able to observe at one time all radar targets in his vicinity and to select particular targets of interest.

With the introduction of microwave frequencies and the PPI, the role of ground radar increased. Night fighter aircraft could be directed close enough to enemy bombers to enable their airborne radar to take over and make final interception; day fighters could be directed into position to intercept approaching bombers; and escort fighters could be directed to their rendezvous with friendly bombers.

Tracking ground radars which could "lock on" to an enemy airplane and follow its motion automatically were synchronized with anti-aircraft guns, so that the guns bore continuously on their target until it was within range. The same tracking radar was adapted to an important use in the close air support of ground

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Tube Data

ELECTRICAL CHARACTERISTICS	35TG	100TH	250TH	450TH
Filament: Thoriated Tungsten				
Voltage	5.0 volts	5.0 volts	5.0 volts	7.5 volts
Current	4.0 amperes	6.3 amperes	10.5 amperes	12.0 amperes
Amplification Factor (Average)	39	40	37	38
MAXIMUM RATINGS				
Plate Dissipation	50 watts	100 watts	250 watts	450 watts
D-C Plate Voltage	2000 volts	3000 volts	4000 volts	6000 volts
D-C Plate Current	150 ma.	225 ma.	350 ma.	600 ma.
Grid Dissipation	15 watts	20 watts	40 watts	80 watts
RADIO FREQUENCY POWER AMPLIFIER AND OSCILLATOR				
Class-C Telegraphy (Key down conditions)				
Typical Operation—1 Tube				
D-C Plate Voltage	1500 volts	2000 volts	3000 volts	4000 volts
D-C Plate Current	125 ma.	165 ma.	333 ma.	450 ma.
D-C Grid Current	40 ma.	39 ma.	90 ma.	85 ma.
D-C Grid Voltage	—120 volts	—80 volts	—150 volts	—200 volts
Plate Power Output	141 watts	235 watts	750 watts	1350 watts
Plate Input	188 watts	335 watts	1000 watts	1800 watts
Plate Dissipation	47 watts	100 watts	250 watts	450 watts
Peak R. F. Grid Input Voltage, (approx.)	250 volts	230 volts	395 volts	410 volts
Driving Power, (approx.)	9 watts	8 watts	32 watts	35 watts

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troops. With it a friendly plane could be put precisely over a designated ground target.

"Since V-J Day development has been concentrated on extending the range and coverage of ground radar and on the elimination of the human element in the detection and interception of enemy aircraft and missiles.

Navigation aids: During the past two years Air Force development of electronic navigation and traffic control systems for aircraft has been greatly intensified in coordination with both civil and other military agencies. A number of experimental systems have been developed by the Air Force, and tests to evaluate them are now under way or about to start. An agreement has been reached as to the operational requirements for a short-distance navigation and traffic control system applicable to military as well as to all civil aircraft. Quantity procurement is starting on the first items for this system.

Television: Lightweight airborne television equipment developed by the Air Force can be installed in a remotely-controlled crewless aircraft to transmit instantaneous visual pictures of the control panel and of the view ahead to the guiding or "mother" aircraft. Other late trends include the development of miniature television equipment for use where size and weight limitations preclude the use of standard devices.

Remote guidance and control: A signal event occurred in this field when in September 1947 a Douglas C-54 Skymaster with an electro-mechanical "brain," took off at the push of a button from Stephenville, Newfoundland, flew alone across the Atlantic some 2,400 miles, and landed at Brize Norton airfield near London approximately 10 hours later. No mother aircraft was used, and although Air Force crewmen and observers were aboard the unique plane, not once was it necessary for any of them to take over a control or to correct in any way the electro-mechanically controlled course. Two ships in the Atlantic transmitted the necessary bearing beams to keep the Skymaster on its course. A beam at the end of the English airfield turned to into the glide path and lowered the landing gear. Shortly after the wheels touched the runway the Skymaster braked itself to a stop.

In discussing Air ROTC activities, General Spaatz stated:

The mission of the Air Reserve Officers' Training Corps is to produce college-trained officers primarily for the Regular Air Force, the Air Force Reserve, and the Air National Guard.

Air ROTC courses are conducted on a four-year basis and are divided into two major categories, basic and advanced, each providing for two years of instruction. First and second-year courses are normally common both to air and ground trainees and consist primarily of basic training

NAVY

Joint Exercise Camid

Task Force 82, an aggregation of 147,000 tons of fighting ships of the amphibious force of the United States Navy's Atlantic Fleet, aided by the Army, Air Force and Marines, established a beachhead just south of the summer resort of Atlantic Beach on August 21, 1948. It was the final phase of Operation Camid, part of the training of West Point cadets and Annapolis midshipmen, who made the actual landing through the surf.

More than 10,000 spectators, including foreign military observers, saw the spectacular landing operation from stands and other vantage points on the beach. Amid TNT explosions simulating barrage shelling and bombing, more than 1,500 men, with tanks, trucks, heavy guns and all necessary support equipment, were put ashore within a few hours from forty-six vessels. In addition, 200 paratroopers of the 82d Airborne Division were dropped behind "enemy" lines just before the first wave of amphibious tanks hit the beach a mile away.

France, Canada, Norway, Italy and Sweden were represented by official military, naval or air observers at the exercise, which was open to the public.

William H. Draper, Jr., Under Secretary of the Army, after watching the landing, said it was "splendid" and that amphibious operations "demonstrate practical unification of the three services."

Mr. Draper's reference was to the fact that while a Navy admiral commanded the operation, it was planned and executed by staff and operational units of all three services. Army, Navy and Marine personnal participated in the landing: Air Force, Navy and Marine planes provided the air cover in split-second coordination with naval gun-fire and ship, boat and troop movements. A land general—in this case a Marine, but in a larger actual offensive operation he would be an Army general —went ashore to take command once the beachhead was secure.

The firing in this instance was simulated, but a few days earlier, at Bloodsworth Island in Chesapeake Bay, the entire operation, except for the actual landing of troops, was carried out with live fire, including rocket bombardment from ships and planes, beach strafing and naval gunfire. Because of the proximity of densely populated areas, live fire was not feasible at the Atlantic Beach situation, and at Bloodsworth Island the only live-target area on the east coast, the swampy terrain does not afford facilities for landing troops.

The parachute drop of 200 men and the use of Air Force and Marine jet planes were among the more spectacular of the events. Lieutenant Francis Sheridan, of Boston, leader of the paratroopers and a veteran of Normandy and Holland drops in combat, landed almost at the feet of Major General Clovis Byers, 82d Air Borne commander, waiting in the drop area where all 200 men landed without incident.

Marine Lieutenant Colonel Mario Carl, who led the Navy "Phantom" jet interceptor planes on their strikes has been clocked at 650.7 miles an hour. Two Air Force jet planes which skimmed thirty feet over the beach for reconnaissance caused the crowd to duck, and thrilled it more than heavy explosions nearby caused by simulating bombardment.

U. S. Naval Institute Proceedings.

More About Radio Ranges

Information regarding some of the uses of aeronautical radio ranges by surface vessels has been placed at the disposal of "navigators" on the Great Lakes through the 1948 edition of the "Radio Aids to Navigation, Great Lakes." It now appears that some of the masters are making good use of this additional "aid to piloting" (there is no "navigation" as such on the Great Lakes — there is actually only "piloting" when these two terms are used in the naval sense).

Information regarding the aero ranges has been inserted in two places in the "Radio Aids to Navigation, Great Lakes." First at the end of the radio beacon section there is a subsection on aero-ranges in order that these ranges may be used to supplement beacons where there is a long shore space between adjacent beacons. This condition exists to a marked degree in Lake Superior. Secondly, there is a subsection at the end of the section on radio weath

aids describing the weather broadcasts made via the ranges. The above listed subsections first give a general description of aero ranges followed by details of some of the ways in which they can be used by the "navigator," and then list the various stations by geographic name, call letter, frequency, exact position, and in the first subsection, by range leg bearings, and in the second, by periods of weather broadcast.

All of the American ranges and some of the Canadian ranges in the Great Lakes area broadcast weather. These broadcasts are local and give only present weather on pre-determined schedule twice each hour. So far as we have been able to determine, the weather information is considered the most helpful here on the lakes, with use as a radio beacon coming next. It is doubtful whether or not the directional legs are used to determine lines of bearing. The weather angle is particularly helpful for vessels entering the Saulte Ste. Maria Canal from Lake Superior. Many times the visibility may be excellent just a few miles up Lake Superior from the "Soo," while fog banks persist in the canal area which are not indicated by general weather reports. Masters are most anxious to know what visibility exists at the locks as they approach. The ones who have not gotten on to listening to the aero ranges at the "Soo" call up on the ship-shore telephone and ask for local visibility. The ship-shore frequency is heavily overcrowded, so that as more masters become familiar with the above described procedure of obtaining "Soo" visibility conditions, the heavy load on the ship-shore circuit will be cut down. It has been authoritatively stated that more ships and more tonnage passes through the Soo Locks in the eight to nine months navigational season than passes through the Panama, Suez, and Kiel Canals combined in their twelve months navigational season, so that any assistance which can be given to facilitate the movement of ships in this area aids industry in general in the United States. This is particularly true as approximately 85 percent of the iron ore of the United States moves through the Soo Canal.

The Officer in Charge, Branch Hydrographic Office, Cleveland, Ohio, concurs that the uses to which aero ranges can be profitably applied should be better known by navigators and boat handlers in the Navy, and that further studies should be made as to additional uses which may be made of these handy aids—as, for instance, placing radios in large motor launches, etc., for use in connection with the ranges.

U. S. Naval Institute Proceedings.

Capt. Bernstein at Monmouth

Capt. H. E. Bernstein, U.S.N., has been assigned to serve as Naval Advisor on the staff of Brig. Gen. Francis H. Lanahan, Jr., commanding general of Fort Monmouth, the Signal Corps' principal research, development and training installation. He is believed to be the first Naval officer to be assigned to the staff of the Commanding Officer of another service within the continental limits of the United States.

Capt. Bernstein will also be the Navy liaison officer for the U. S. Army Signal Corps Engineering Laboratories, commanding officer, U. S. Navy Electronic and Electrical Standards Agency, and the Navy's co-director of the Army-Navy Electronic and Electrical Standards Agency.

He served in the Navy's Electron-

A LONG AND PLEASANT PARTNERSHIP

FOR MANY YEARS the armed forces and the General Electric Company have cooperated closely in many projects. Some have been routine in nature, some extremely complex. But, in all of them, the close association between our engineers and the military, we believe, has resulted in better solutions to these varying problems than either of us might have achieved working independently.

With the ever-growing importance of electronics as a vital factor in our national defense, this close alliance assumes even greater significance.

To supplement this personal relationship, to assist in reducing new ideas and projects to tangible products—Electronics Park facilities are available. Over and above the actual physical plant are the research, engineering and technical skills of General Electric, plus its long experience in the field of electronics.

The future may produce greater problems than the past, but to overcome them we will have these greater facilities and this greater ability to work closely together because of a long and pleasant partnership.

General Electric Company
Electronics Park, Syracuse, New York.

GENERAL ELECTRIC

G-4



Captain H. E. Bernstein.

ics Bureau for some time. During the war he was head of the Radar Section in the Design Division, and later headed the Installation and Maintenance Division. While at those posts, and later as Deputy for Electronics, he accumulated an enviable record as a leader and organizer.

Capt. Bernstein initiated a plan to train several hundred Naval officers, enabling them to give specialist treatment to all types of electronic equipment throughout the Navy.

SIGNAL CORPS

Van Voorst to General Staff

Until World War II only a total of a half dozen Signal Corps officers had been chosen for War Department General Staff, during the years between the two wars. It is satisfying to report the recent assignment of Colonel Marion Van Voorst to the Army General Staff, in the Personnel and Administrative Division.

Increased recognition is now being given to Signal Corps officers, with some 26 of them on General Staff at the Pentagon. These include Major General W. O. Reeder, now deputy to the Director of the Logistics Division, and Major General W. B. Persons, on the staff of the Secretary of Defense.

Signal Corps officers are now assigned to the Joint Chiefs of Staff, the Personnel and Administration Division, the Intelligence Division, the Operation and Training Division, the Logistics Division, and the Plans and Operations Division of the General Staff.

Colonel Van Voorst during World War II was a Brigadier General and assistant military attaché in London. He graduated from USMA November 1, 1918, and has been continuously in the Signal Corps except for three years in the Coast Artillery immediately after his graduation.

Pentagon "Ham" Station

After several wartime years of absence from the amateur radio bands, the Army has resumed direct contact with the amateur fraternity through its "ham" station in the Pentagon, K4USA.

Major General S. B. Akin, Chief Signal Officer of the Army, in announcing the opening of K4USA, recalled that amateur radio operators provide a valuable reserve of skilled personnel which the military services can draw upon in event of an emergency. He pointed out that in peacetime, too, they frequently furnish vital communications in disaster areas where commercial facilities might be inoperative.

The Signal Corps Chief stated that K4USA will operate with both continuous wave and telephone emissions because each has its advantages, depending on circuit conditions and application. The day of the brass pounder is not yet passed, the general asserted.

Looking to the future, however, General Akin noted that remarkable progress is being made in the development of teletype, television, facsimile and other modern equipments which are both lightweight and compact. These equipments, the general said, may ultimately replace terminal equipment on many of the Army facilities now in use.

General Akin recalled that in every theater of war the amateurs formed a hard core of radio communication personnel who helped through their own accomplishments and through the example they set to other operators who had not had the advantage of long experience and training in communications. Similarly, in the various schools operated by the Signal Corps during the war, the ex-amateurs on the instructing staffs strengthened the whole school organization and, because of their background of experience, expedited the flow of graduating students. In the communication manufacturing industries there exist large and small companies which in many cases were started by amateurs, the general pointed out. He observed that their principal initial market was the amateur fraternity and that they served as the nucleus for expanded wartime production of communication and radar equipment.

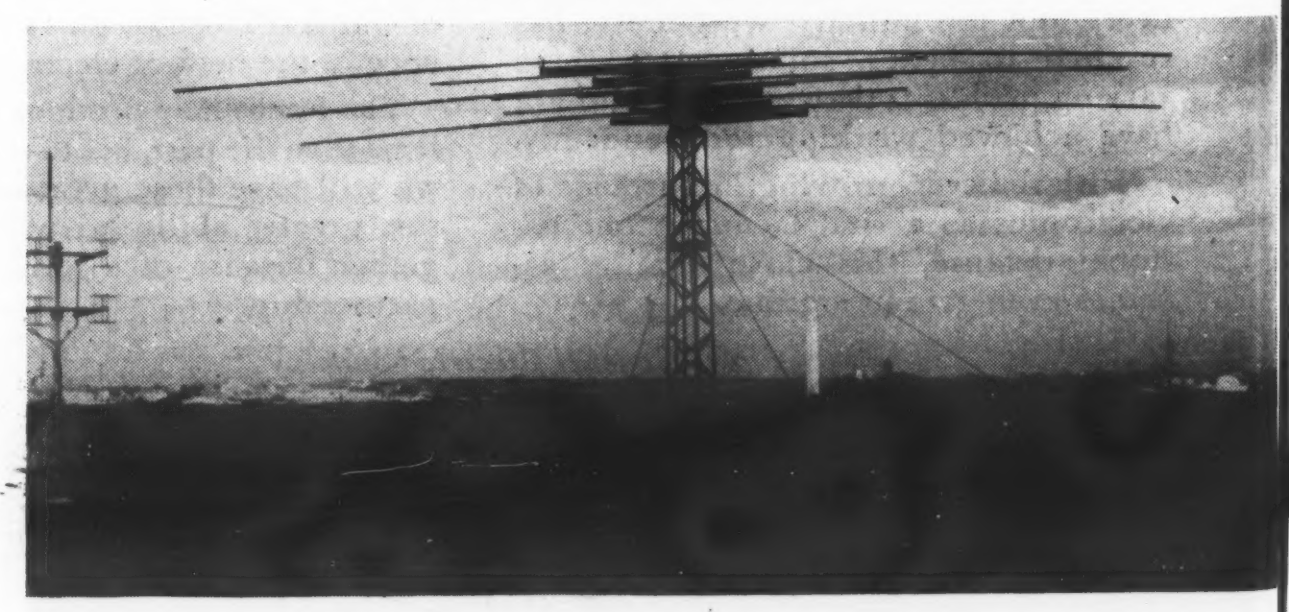
K4USA will operate daily on the 3.5, 7, 14 and 28 megacycle bands and will contact as many amateurs as possible throughout the world. Transmissions on 14 and 28 megacycles will be by means of a Signal Corps BC610E transmitter installed in the Pentagon and using a dual 10 and 20 meter, three-element rotary beam antenna. Transmitters for the 40 and 80 meter bands are operated remotely from the Pentagon and are located at the transmitting stations of WAR at Battery Cove and Fort Myer, Virginia.

Electronics Windmill

Making the weather do the work of reporting itself by harnessing the wind is the goal of an experiment in progress at the Signal Corps Engineering Laboratories at Fort Monmouth, N. J.

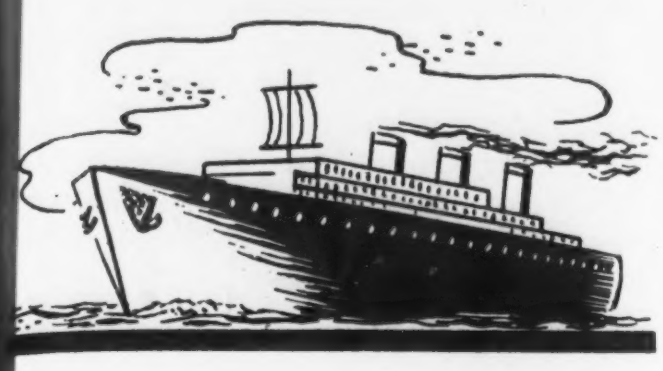
Having developed an automatic weather station that can send radio reports on temperature, pressure, relative humidity, wind speed, wind direction, precipitaton and sunshine

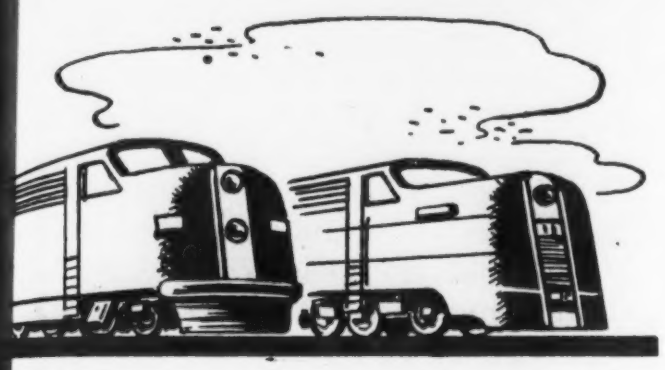
K4USA antenna on the Pentagon.

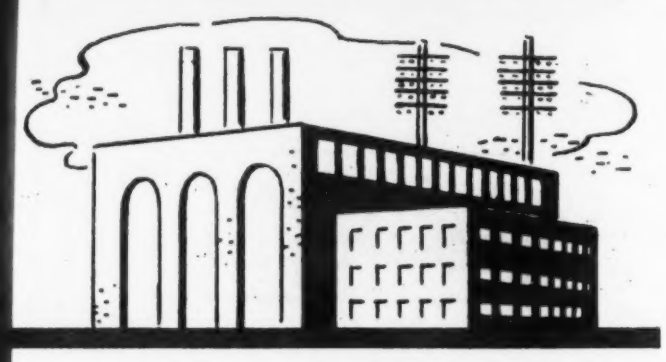


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intensity, the Signal Corps now is seeking to extend its period of unattended operation beyond one year. If current experiments are successful, the weather stations will be placed in near-inaccessible corners of the world and allowed to run themselves.

The problem has been attacked by combining modern electronics with the centuries-old windmill.

Signal Corps scientists, working closely with the Wind Turbine Company of West Chester, Pa., have developed a wind-driven generator which charges a bank of storage batteries. The batteries in turn operate the automatic weather station. Instead of the picturesque arms usually associated with windmills, the Signal Corps currently is trying a three-bladed propeller to catch the wind and make it turn the generator.

Cold and ice present problems that are being investigated. Tests have been made of de-icing equipment, and consideration is being given to placing the batteries in an underground vault to keep them from freezing.

Zahl in Top Lab Job

Dr. Harold A. Zahl, of Red Bank, N. J., holder of the Legion of Merit for contributions made in the fields of radar and vacuum tubes, has been appointed Director of Research of the Signal Corps Engineering Laboratories, one of the top-flight civilian posts in the U. S. Army.

The position, which carries a professional Civil Service rating, is attainable only through Congressional action.

Ceremonies at which Dr. Zahl was officially installed by Brig. Gen. Francis H. Lanahan, Jr., commanding general, were attended by several noted scientists. Among them were D. Donald H. Houghridge, senior scientific advisor for Secretary of the Army Kenneth C. Royall; Prof. Isidor I. Rabi, Nobel prize winner, and one of the world's outstanding professors of physics and a member of the general advisory committee of the Atomic Energy Commission, and Prof. David M. Delo, chief of the Scientific section, Research and Development Group, General Staff, U. S. Army.

Also taking part in the ceremonies at the post theater, Fort Monmouth, were James E. Rossell, director of the Second U. S. Civil Service Region; Col. Edwin R. Petzing, chief of the Signal Corps Engineering and Technical Division, Col. Paul L. Neal, Deputy Commander in charge of research and development, who introduced Dr. Zahl. Key representatives of several electronic firms also attended. The Fort Monmouth Signal Corps band played before and after the ceremonies. An informal gathering followed at Gibbs Hall Officers Club.

Dr. Zahl has been associated in research and development work with the Signal Corps since 1931 when he was appointed a physicist at the Fort Monmouth Engineering Laboratories, excepting for a period of war service beginning in 1942. He was promoted from Major to Lieutenant Colonel in 1945.

Before the war, for 11 years, he participated in many research and development projects, including work on sound, infra-red, vacuum tubes and radar. He has been intimately connected with the Army program on radar since its inception, and was civilian engineer-in-charge of the first service tests on Army radar. He has also been active in connection with the general U. S. Army program on vacuum tubes, and is responsible for the development of a number of types used in U. S. Army equipment. As an officer, Dr. Zahl continued to serve with the Signal Corps engineering laboratories, dividing his time between technical and administrative matters pertaining to the development of electronic equipment and vacuum tubes for use by the Armed Forces.

Upon separation from the Army in 1946, Dr. Zahl re-entered the signal Corps Engineering Laboratories as a civilian and was shortly thereafter named "Chief of Engineering Staff." He acted as official Signal Corps observer at the atomic bomb test at Bikini during the Summer 1946. Following his return from Bikini he was given the assignment of building up a long-range postwar research program for the Signal Corps. In his new appointment, Dr. Zahl will continue to emphasize research directed towards improving the defenses of this country.

He is the author of many scientific articles dealing with various research investigations conducted in the field of physics and is holder of a large number of patents pertaining to vacuum tubes, radar, and communications. He is a member of the American Physical Society, Institute of Radio Engineers, New York Academy of Sciences, and is on the Board of Directors of the Armed Forces Communications Association.

Maj. Gen. S. B. Akin, Chief Signal Officer looks on as K4USA, new "ham" station takes to the air.



CIVILIAN COMPONENTS

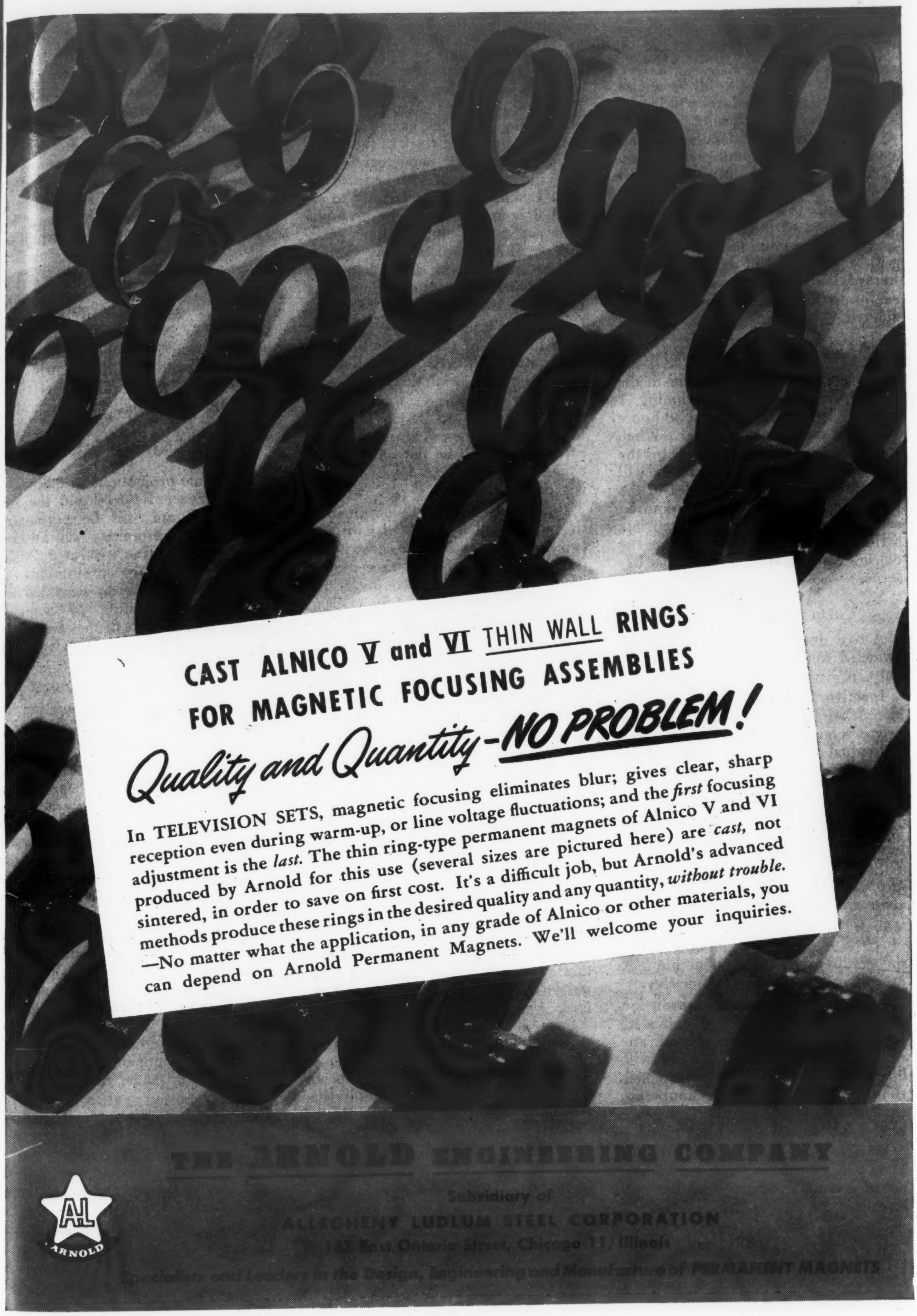
Promotion Regulations Issued

The Army and Air Force have issued regulations regarding the promotion of Reserve Officers. Extracts appear below:

For Army Reserves: Details pertaining to promotions in the Army Reserve and requirements to maintain an active commisison in the ORC have been announced by the Department of the Army in amendments to Circular 356 (1946) and Army reserves for the first time since the close of World War II hostilities have the opportunity to analyze their present and future status as civilian component officers.

Requirements for Promotion—Reserve officers in the Active Reserve only will be promoted to the next higher grade (not above colonel) provided a vacancy exists in that grade and requirements are met.

Promotions will be accomplished by selective procedures to secure the best qualified among those officers


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reasonably available to fill vacancies. These selective procedures will in general follow the following methods: (1) The area commander will appoint a sufficient number of boards of officers to be known as Reserve Selection Boards at such times and in such locations as deemed appropriate for selection of the best qualified officers for promotion. (2) Boards will be composed of an uneven number of officers, not less than three, senior to the individuals to be considered.

Active Reserve Requirement

Officers, in order to remain in the Active Reserve, must, beginning 1 January 1949 obtain at least 30 hours of credit each calendar year. When first assigned or reassigned to the Active Reserve, required credits will be prorated for the remainder of the current calendar year. If the required credits are not obtained, appropriate action will be taken to reassign the officers concerned to the Inactive Reserve.

Credits for Reservists

Active duty—Eight hours will be awarded for each full day of active duty.

Inactive Duty Status — Credit for attendance at classes of troop or group schools, special assemblies for individual training and tests will be given as follows:

(a) For students — One or two hours for each class depending on actual time spent but not to exceed 2 hours for any one class assembly. When more than one class is held in any one day, time actually spent in class will be credited but will not exceed 8 hours in any one day.

(b) For instructors—Three times the credit given the student but not exceeding 8 hours in any one day.

Army extension courses—credit for students will be the hours indicated for sub-courses in the annual announcement for courses. Credit will be allowed for partially completed sub-courses based on the hours assigned to lessons for which satisfactory solutions have been submitted.

On-campus instruction of ROTC units will give 3 hours for each hour actually spent in instruction, but not to exceed 8 hours in any one day.

(*Editor's Note: The Army has under consideration AFCA's request for credits for attendance at chapter meetings and the annual meeting.*)

Administrative work credits as a member of a court or board will be in accordance with the actual time spent on such duties, but not to exceed 8 hours per day. Medical officers conducting physical exams or performing equivalent work in the preparation of military personnel for active duty training will be credited with 1 hour per exam but not to exceed 8 hours per day. Reserve officers performing duties under jurisdiction of Office of Selective Service will be credited with actual hours engaged but not exceeding 8 hours per day.

Credit of 8 hours will be given for each full day of training on an inactive status with units of the Regular Army, or at special service or general service schools or with units of the National Guard or ORC. Credit for shorter periods of training on inactive status will be the actual hours engaged but not exceeding 8 hours per day.

Rated liaison pilots flying on inactive status will be credited with (a) two hours for each hour spent flying in military aircraft, not exceeding 8 hours per day; (b) two hours for each hour spent as pilot in civilian aircraft made available for use in connection with the training program, not exceeding 8 hours per day.

Procurement planning and industrial mobilization — Credits in this category work will be as determined by the office of the Assistant Secretary of the War or the chief of the supply arm or service under whose jurisdiction the work is performed, but not to exceed actual time so spent, nor more than 8 hours per day.

The Chief, Army Field Forces, is authorized to allow credit for hours spent for other services performed by reserve officers on the basis of 1 hour for each hour spent in performing the service. Hours credited for inactive duty will be granted for activities that are supervised or approved by a unit instructor or other officer authorized.

AF Reserve Regulations

Another step forward is the postwar program for Air Force Reservists was recorded in late July when Regulation 45-5 was issued by the Department of the Air Force.

Required Credits — An officer of the OAR ort he ANG will be considered to have properly maintained his proficiency, provided he obtains an average of 225 credits annually during each three-year period. Accordingly, any officer of the OAR or the ANG who, in any period of three consecutive years, fails to obtain a total of at least 675 credits (including 150 credits for attendance at field training) will be considered to have not properly maintained his proficiency and will be required to appear before a board of officers for the purpose of determining whether or not such officer should be relieved of assignment to the OAR if an officer of the Air Force Reserve, or have his Federal recognition withdrawn if an officer of the Air National Guard.

Certificate of Capacity — A certificate of capacity, as distinguished from the certificate of Eligibility awarded to National Guard officers under section 75 of the National Defense Act, will be awarded when an officer meets the requirements for a promotion to a higher grade.

Appointments and Promotion

Peacetime promotions of officers of the Air Force Reserve and the Air National Guard will be permanent promotions, but nothing will be construed as conflicting with or prohibiting the temporary promotions of those officers while on extended active duty. Promotion of commissioned personnel will be based on efficiency and demonstrated command or staff ability.

The following provisions will govern appointment and promotion of officers of the USAFR and the ANG:

(1) No individual will be commissioned prior to reaching his twenty-first birthday; (2) No officer will be initially appointed to a grade unless he shall be able to serve a minimum of two years in the grade to which appointed prior to reaching the maximum age-in-grade; (3) No officer shall be promoted unless he shall have attained the credits specified and attainment of such credits will be indicated by a Certificate of Capacity; (4) No officer will be appointed, promoted, or assigned to a T/O&E unit of M-Day assignment unless a position vacancy exists either in the grade held by such officer at the time appointment, promotion or assignment is made, or in a higher grade.

Promotion of Officers — No officer who has been considered and not recommended for promotion by a promotion board will be considered again by a promotion board composed of the same members or on which a member of the board which did not recommend him for promotion is sitting.

Subject to the preceding provisions, officers may be promoted to a

grade higher than that held upon attaining the number of credits specified below, except that the requirements for attainment of credits may be waived in those cases where officers have clearly demonstrated qualifications by actual performance of duties of the higher grade for a minimum period of six months on active duty between 7 December 1941, and the date of this regulation, which is 6 July 1948. Subsequently the requirement for the attainment of credits may be waived in those cases where officers have clearly demonstrated qualifications by actual performance of duties of the higher grade for a specified period of time as follows: Colonel, 24 months; Lt. Colonel, 18 months; Major, 15 months; Captain, 12 months and 1st Lieutenant, 6 months.

Duty Credits

For the purpose of counting credits accrued under this table "annually" shall be construed as meaning from the beginning to the end of the fiscal year.

(a) For attendance at scheduled assemblies for instruction and training (maximum annual credit—250) —5 credits will be awarded for attendance at each such assembly.

(b) For attendance at 15-day field training exercises or maneuvers (maximum annual credit—150) — 150 credits will be awarded for attendance at and completion of each field training period or a pro rata share for completion of any part thereof.

(c) For participation in tours of active duty or temporary duty, excluding field training, but including attendance at service schools (maximum annual credit—250)—25 credits will be awarded for each week of such duty or a pro rata share for completion of any part thereof.

(d) For successful completion of extension course subcourses (maximum annual credit—260 credits).

(e) For active participation in training or duty with troops to include flying, administrative duties, instructional duties, duty as a member of a court or board, and similar miscellaneous participation in military training or duties (maximum annual credit—250)—1 credit for each hour of such duty or training; 1 credit for each hour of preparation by instructor, but not to exceed three times the number of hours required for actual instruction; 1 credit for each hour of flying time recorded (AF Form 1) pursuant to training directives. Maximum daily credits—5 credits.

(Editor's Note: The Air Force has under consideration AFCA's request for credits for attendance at chapter meetings and the annual meeting.)

Ohio NG Encampment

(A communication from Roy Tucker, 37th Signal Co.)

Service to the 37th Infantry (Buckeye) Division, in its normal capacity as the unit responsible for the communications and photography for the division, rather than training its new men as the other units were doing, was the job of the 37th Signal Company of the Ohio National Guard at the recent two-week encampment of the ONG at Camp Atterbury, Indiana.

Although the ONG had a small encampment at Camp Perry, Ohio, last year, this was the first really big training period in which practically all the units of the 37th division, as well as numerous separate units of the ONG, participated. Six officers and approximately 75 enlisted men made up the composition of the 37th.

After 3 or 4 hectic days of installation and construction, in which the few experienced men in the company were worked hard, every unit in camp was complete with telephone service and a message center was in operation to serve the division headquarters. The signal company had in addition such miscellaneous jobs as preparing and distributing a SOI, and installing and repairing signal equipment for other units in camp, plus its photography role.

Rifle marksmanship, hiking, bivouacs, and other military training were crowded in between various duties for the large number of men with no previous military experience.

In summing up what we of the 37th Signal Company accomplished, I think that we adequately furnished communication service to over twelve thousand men, and trained a fine bunch of youngsters in the art of signal work. It was in keeping with our unit's glorious accomplishments at New Georgia, Bougainville, and the Philippines, in the Pacific theater where the "Buckeye" division had a long and victorious record.

STATEMENT OF THE OWNERSHIP MANAGEMENT, CIRCULATION, etc., required by the act of Congress of August 24, 1912, as amended by the acts of March 3, 1933 and July 2, 1946, of Signals Magazine, published bi-monthly at Washington, D. C., for October 1, 1948.

City of Washington } ss.
District of Columbia }

Before me, a notary public, in and for the State and County aforesaid, personally appeared Wallace R. Fingal, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Signals Magazine and that the following is, to the best of his knowledge and belief, a true statement of the ownership and management of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher: Armed Forces Communications Association, 1624 Eye St., N.W., Washington 6, D. C.

Editor: Brig. Gen. S. H. Sherrill (Ret.) same address.

Managing Editor: Wallace R. Fingal, same address.

Business Manager, Wallace R. Fingal, same address.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company or other unincorporated concern, its names and address, as well as those of each individual member, must be given).

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:
None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

WALLACE R. FINGAL, Bus. Mgr.

(Signature of editor, publisher, business manager or owner.)

Sworn to and subscribed before me this 21st day of October, 1948.

[Seal] EMILY H. KNOTTS
Notary Public
(My commission expires 14 December 1951)

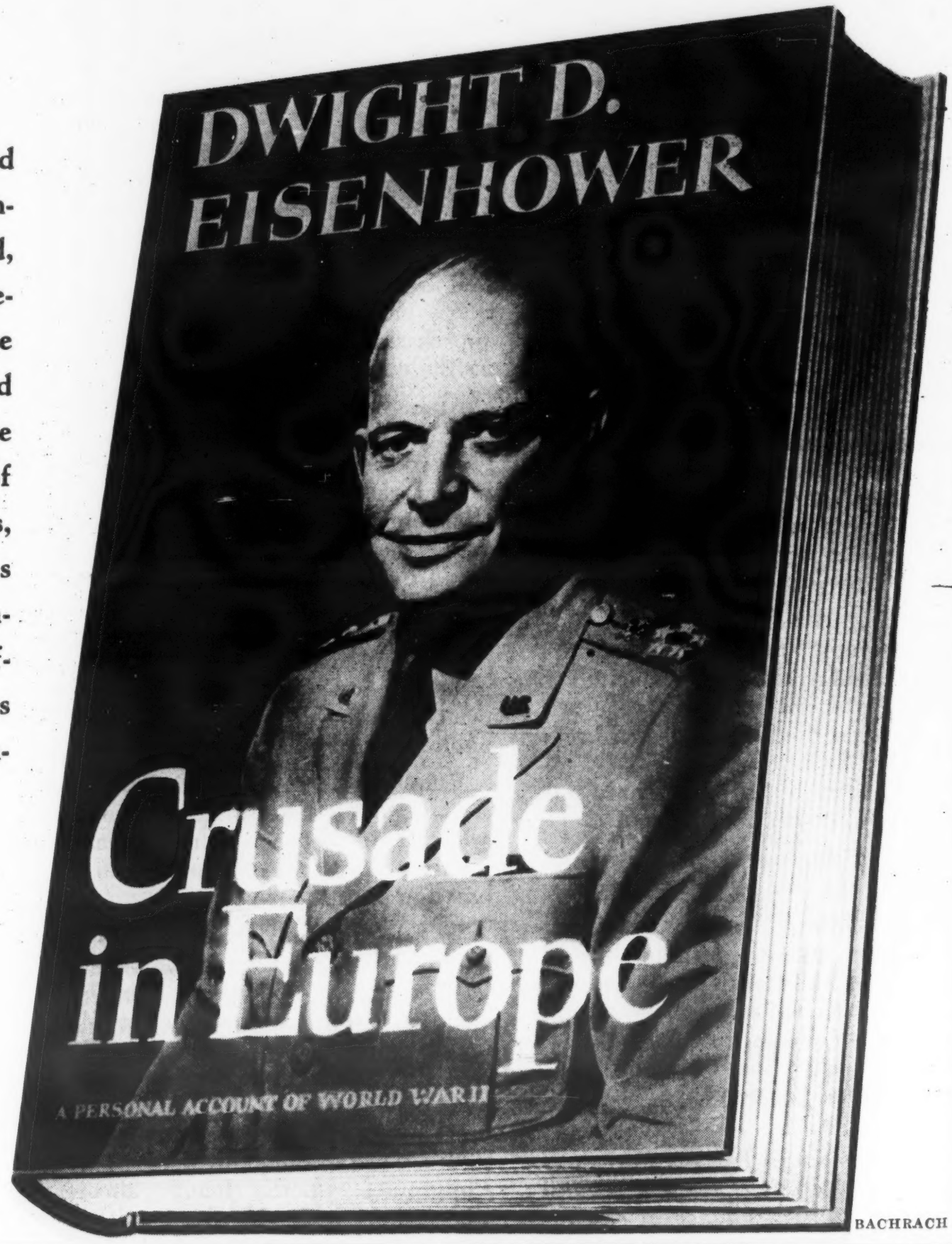
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Crusade in Europe

A PERSONAL ACCOUNT OF WORLD WAR II, *by*

DWIGHT D. EISENHOWER

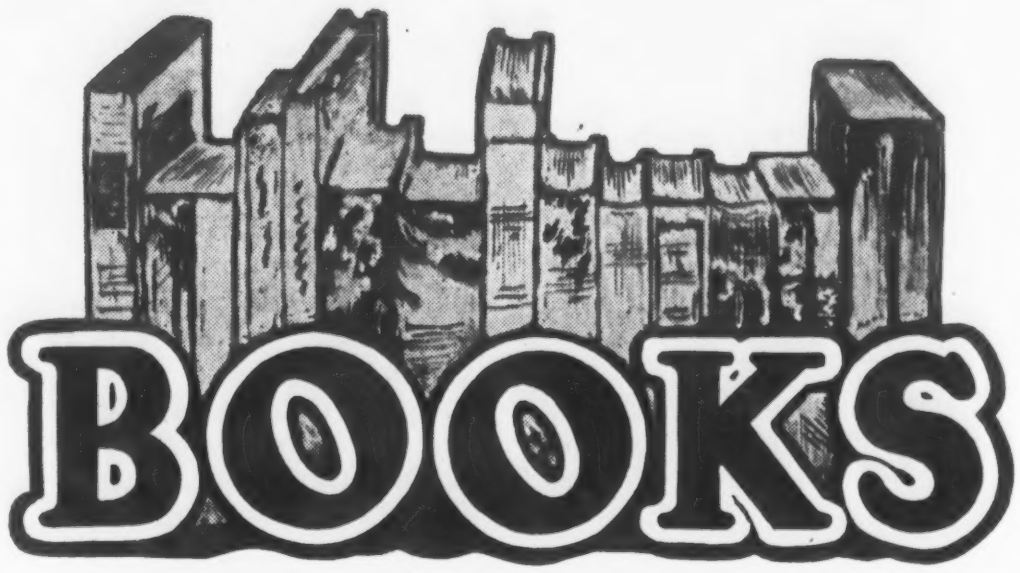
The vivid drama of World War II, as the Supreme Commander planned, directed, lived it . . . the fateful decisions . . . the strategy . . . the battles . . . the heartaches and victories—written with all the warmth and understanding of a truly great leader. 576 pages, illustrated with photographs and maps, and a section containing army organization references, glossary of operations code names, notes and an index.



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AND SERVICES

M. K. ORMSBEE, Secretary

CRUSADE IN EUROPE, by Dwight D. Eisenhower. pages. Doubleday & Co., Inc., $5.00.

THE WORLD, while recognizing that General Eisenhower is a man of action, not of letters, will expect a work of very high quality from him; and it will not be disappointed. The book meets every test.

The first and greatest test, accuracy being taken for granted, is that of interest. It's simple truth to say that this book is absorbing. Every intelligent citizen, veteran or not, will find it so. The main reason for this is that General Eisenhower realizes that he has a great theme—the story of the most perfect alliance of nations in history, for the salvation and vindication of democracy in the greatest of the world wars. He does not content himself with merely describing a series of military operations, as Grant and Pershing did; he points out the stupendous character of the struggle, and the tremendous aggregation of the union that was forged to wage it.

The book itself has epic equalities. It will leave a glow in the heart—a glow of admiration for the British, the Free French, the Americans, the democratic hosts everywhere and the great cause for which they fought. While the narrative itself rises to its high theme, it does not lack human warmth. It is full of careful, honest, and often incisive projections of leaders and associates; it offers particularly notable studies of Roosevelt, Marshall and Churchill, and it is sown with revealing anecdotes and incidents.

Another test is that of comprehensiveness. In such a book as this the great difficulty is furnishing a complete picture without getting bogged down in detail. Readers of this book will feel that they are getting the *while* story and yet they will never lose perspective.

Still another test, that of impartiality, is triumphantly met. The author is as tolerant as he is modest. The planning of the war involved a long series of controversies as to aims and methods. In dealing with these he presents both sides unfailingly; he never becomes partisan; he frankly confesses when he made mistakes. The treatment of figures who became storm centers—Patton, Montgomery and lesser men—is engagingly fair. The author is explicit in bestowing praise; his criticism is implicit.

The style is simple, often to the point of plainness, without affectations or mannerisms. It is lucid, flexible, and compact. The author possesses a real gift for putting a great deal into a short paragraph. Above all, it expreses the personality of the author. Readers will feel that this is General Eisenhower speaking. That fact, indeed, is one of the chief merits of the book. It has an air of genuineness, a ring of sincerity; the tone is that of a leader, a serene, highly sagacious leader pouring out his special knowledge with the heartiest desire to tell the truth about himself and others.

Altogether, General Eisenhower is to be congratulated upon this book. He need have no apprehensions as to its reception; it does him credit in every way and will be hailed as a memorable addition to the world's stock of entertainment and instruction.

Allan Nevins

ELECTRONIC ENGINEERING PRINCIPLES, by John D. Ryder, 398 pages. Prentice-Hall, Inc., $6.65.

WRITTEN BY a professor of electrical ngineering who has specialized in electronic tubes, this book will prove valuable to anyone interested in studying the action of the various types of tubes. Tubes covered include the cathode-ray indicators, diode rectifiers, vacuum triodes, multi-element tubes, amplifiers for small and large signals, gas diodes, gas-control tubes, photoelectric cells, the cyclotron, and the mass spectrograph.

The author begins with the explanation of the fundamental particles (the various types of atoms), electron ballistics as applied to vacuum tubes, and the actions taking place in such tubes as the cathode-ray type. The necessary mathematics is included, together with curves and diagrams so that the reader is enabled to follow the material easily.

The section on termal and field emission of electrons is very refreshing and makes the subject much clearer than many textbooks on the subject. References are given so the reader can delve more deeply into the various subjects discussed if he desires further information.—H.W.S.

Radio Craft

JOHN J. PERSHING—GENERAL OF THE ARMIES, by Frederick Palmer, 400 pages. The Military Service Publishing Co., Harrisburg, Pa. $4.50.

WITHIN THE hour of the great triumph of the Allied forces in Europe on V-E day General John J. Pershing received this cable:

"As commander of this second AEF, I should like to acknowledge to you, the leader of the first, our obligation for the part you have played in the present victory . . . abilities and common doctrines have facilitated smoothness and speed in handling large formations and permitted a crushing application of tactical power. They have resulted directly from our magnificent military educational system, a system that was completely reorganized and expanded under your wise leadership and with your unstinting support. Eisenhower."

In this fitting tribute lies the key to the importance of Frederick Palmer's biographical sketch. It was Pershing's exactness in training the first AEF that paved the way for the second and thus the story of the soldier who almost became a lawyer provides fresh material in forming the background of the present world situation. It shows why military men of the General Pershing school are not only great soldiers, but foremost American citizens as well.

Seizing on General Pershing's own phrase "Leave it to the record," the author has written an intimate and enduring biography based on deep knowledge and experience that came from close association with the subject for over 40 years. After 20 years prespective he began writing in 1939 and finished it through the close of World War I in 1940.

DANGER FORWARD, 428 pages. Albert Love Enterprises. $5.00.

THIS BOOK describes in detail the nine major engagements of the First Division of World War II. Each battle described is divided into three

parts--first the situation leading up to the battle, second the official record, and third an account by a leading journalist who was there.

The photographic section of nearly fifty pages is of tremendous interest.

Some idea of the way in which the story of the First Division is presented will be gained from the introduction by Hanson Baldwin who says:

"The First Division has no monopoly on courage. Its men are human, its generals fallible. It has had its share of pride and disaster, funk and fright. It has known defeat, it has suffered frustration. It was but one of eighty-nine divisions of the United States Army that fought the good fight in World War II, only a part of the team that scaled the ramparts of glory to bring down into the dust ambitions of Hitler and the pretensions of Japan.

"But it has the magic of its name—*The Red One; The Fighting First.* It wears the armor of history and carries the shield of tradition. It is a symbol—of legitimate pride in past achievements, of a democracy's martial determination. It is a fitting representative of the American Army, and there can be no higher praise."

H. R. Knickerbocker sets the pace for the other writers when he describes the First Division's activities in Algeria. In the first paragraph of his description he says, "Years later I asked Terry Allen what had been the high point of the war for him. He said it was the landing at Oran. That landing was practically unopposed. It could not be compared with later battles of the First Division led by General Allen, either in danger or losses. Yet General Allen, smiling that leathery smile of his, nodded, 'Yes, nothing has ever equalled that night. There was something about it that was never repeated. It was the first time. That's what made it.'"

HISTORY OF ARMY MEDAL OF HONOR, prepared by the Public Information Division of the Army. 468 pages. $4.50.

THIS BOOK represents the first official study of legislative and historical developments in the Medal of Honor as its pertains to the Army from the time of its creation in 1862, during the Civil War. The book contains listings of all Army Medal of Honor winners by states, by campaigns, and in alphabetical arrangement.

Documentary photographs accompany the text, and one section is devoted to photographs of practically all of the Army Medal of Honor winners in World War II. An appendix lists all of the decorations and service medals of the Army, with a brief description of their meaning and order of precedence.

The text traces the effect of historical events upon the decoration from the days in which General Winfield Scott believed that a medal would not be popular with American soldiers to 35 days before V-J Day, when Corp. Melvin Mayfield won the Army Medal of Honor by single-handedly wiping out four Japanese positions in Northern Luzon.

medal—four of them have occurred

The changes in the design of the since it was created—are illustrated and explained.

DIXIE RAIDER, by Murray Morgan. E. P. Dutton & Co., Inc. 336 pages. $4.00.

THE *Alabama*, the *Sumter* and the *Shenandoah*, all of them hit-and-run sea raiders of the Civil War, were as glamorous commands as any captain could want. Of the three the *Shenandoah* had as exicting and fantastic a career as any ship ever launched. A lovely, lean, black-hulled, full-rigged ship, she could peal off sixteen knots under sail and nine knots with her 150-horse-power steam auxiliary. Minus any gun tackle, she was unable to fire her guns, and had to depend on the unbacked bluff of the grim muzzles thrust through the ports to cow the enemy.

The cruise of the *Shenandoah* is a sparkling sea yarn, and a stirring picture of a fascinating type of naval warfare. The author has handled his material excellently, and except for an unfortunate habit of bespattering his pages with modern slang, has been content to let the crew tell their own swift-paced story.

Infantry Journal

FOR WANT OF A NAIL, by Hawthorne Daniel. Whittlesey House. $3.75.

WHEN IN the first week of December, 1776, Washington wrote a letter to General Maxwell assigning him the task of securing or destroying all boats along the Delaware River in order to deny their use to the British in follwing up his crossing, he probably had little thought for the word *logistics.* In preventing the forces of Cornwallis from getting across the river, Washington effected what today would be a victory in logistics. He caught the British without any prepared means of effecting the crossing, and he placed in hand the means for recrossing his own army to surprise and beat the British at Trenton.

With this lesson Hawthorne Daniel introduces a series of six examples of the influence of logistics on war. Assembled under the title *For Want of a Nail,* this is a fresh approach to military history, and is in line with the increasing importance and consciousness of a phase of war which has been overshadowed by the more spectacular tactics, strategy and personalities.

Daniel hardly goes so far as to suggest that logistics won or lost the campaigns of which he writes, but he does draw the logistical phases in their proper light as he explores the Moscow Campaign, the American Civil War, the Sudan Campaign, and the Invasion of Europe in the late war.

It seems obvious that our logistical consciousness has increased proportionately with technological progress. Wars have become all-embracing, and more than ever before the logistical aspect reaches into the heart of the countries engaged. Logistics have their hold on the peacetime nation, which must look into the future through the groundwork of preparedness. As General Brehon Somervell says in his foreword to Mr. Daniel's book, this is a subject "which may well be the key to our ability to prepetuate our way of life."

Cavalry Journal

LORAN: LONG RANGE NAVIGATION, Edited by J. A. Pierce, A. A. McKenzies and R. H. Woodward, 467 pages, McGraw-Hill Book Co. $6.00.

THIS BOOK, Volume IV in the Massachusetts Institute of Technology's Radiation Laboratory series, describes the Loran system and the history of its development. Very few portions require more than an elementary knowledge of radio transmitters, receivers, and pulse techniques to be properly understood. Even though eleven authors contributed, the text appears to have an integrated continuity.

Part I deals entirely with the Loran system of navigation. Included are an introductory chapter describing the principle forms of radio navigation and other chapters on the history and principles of Loran and the propagation of the radio wavelengths involved. Chapter 4, entitled "Future Trends," seems to be somewhat out of place in an otherwise factual and objectively written treatise. A cautious, well-thought-out forecast of possible future trends might well be included in a text such as this, but in the chapter under discussion the author appears to have built one supposition upon another in an empirical fashion seldom found in a truly scientific work.

Part II, entitled ""Loran Equipment," is relatively complete in its coverage and well-illustrated, but is, of necessity, brief in its description of individual devices. The 12-page bibliography will enable a reader interested in further detail to obtain more information.

PRACTICAL DISC RECORDING, by R. H. Dorf. Radcraft Publications, Inc., 25 W. Broadway, N. Y., 75c.

THE PURPOSE of this book is to introduce the radio enthusiast to the art of disc recording and to explain in practical terms the elements of making high-quality records. Disc recording requires no more mechanical ability or knowledge than the average radioman possesses. It can be a fascinating and productive adjunct to radio, or a busi-

ss or hobby in itself. Many hours of easure and profit can be spent in de-gning and constructing recording sys-ms.

The owner of a well-built installation n readily acquire an excellent record brary of music recorded from the dio and by artists at home, as well as story-making speeches, public events, d personalities. Musical backgrounds, ith commentaries, can be provided for me movies. In addition, the service-an will profit from a thorough knowl-dge of recording. More and more dios today are equipped to *make* cords as well as play them.

ICROWAVE RECEIVERS, Edited by S. N. Van Voorhis, 611 pages. McGraw-Hill Book Co., Inc. $8.00.

THE WORTH and extent of the Massachusetts Institute of Technology adiation Laboratory Series of books is ell known. "Microwave Receivers," olume 23 of that series, is intended to cquaint the reader with the large mount of information gathered, and he various techniques employed, by he members of the Radiation Laboratory in the solution of the problems hey encountered in designing and constructing receivers for the microwave egion. It covers work done not only the Radiation Laboratory, but at her research laboratories as well. The ook begins with a discussion of noise receivers in general and points out he extreme importance of fluctuation oise in microwave receivers. The various components that are used in such receiver are then taken up in detail. he reader is informed of the various ifficulties to be encountered in the design of such things as TR tubes, converters, local oscillators, intermediate-requency amplifiers, detectors, etc. nd with the various methods of avoiding those difficulties. The concluding hapters contain detailed descriptions f several different microwave receivers, llustrating a large variety of circuits nd techniques.

The years which have elapsed since World War II have seen the opening f the microwave region to use not only y the communication industry but to ther services as well. Since the receivers described in this book were intended primarily for radar use, the ncounter many problems that are not present-day microwave engineer will iscussed in this book, as well as finding some material not applicable to is work; but he will find a large mount of material that he can use irectly, and from the rest he will get any helpful leads. This book is recommended to him without reservation.

INSIGNIA OF THE ASSOCIATION

AVAILABLE TO MEMBERS FROM THE SERVICE DEPARTMENT

The insignia of the Association in several beautiful designs and convenient styles authorized for wear by members. They are available at the prices quoted below. The insignia is described as follows:

The central figure is an alert powerful American eagle with strong talons clutching lightning flashes—symbolic of a strong America and national defense —especially insofar as modern communications is concerned, our basic reason for existence. The border consists of leaves of the olive branch of peace, showing that the object of military preparedness in America is to assure a lasting peace. In the background are signal flags—a means of signaling used on shipboard in the Navy and in some Army and Marine units. Just above the eagle and between his outstretched wings is a heavy bomber in flight, symbolizing the complicated and essential communications in the Air Force, and in Naval and Marine aviation. Above that is a radar antenna array, and at the very top a radio relay antenna—for the latest major step in military communications. And none of these could exist without industry—the foundation of AFCA. In the color version there are the traditional colors of the signal flags—dexter white flag with red center and sinister red flag white center—with a gold border to the whole.

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Specify whether signal flags should be in red and white enamel or in gold.

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Letters TO THE EDITOR..

SIR:

Copies of SIGNALS are widely distributed by me and are highly prized by the Royal Signals Officers at the School. I, personally, feel that your occasional technical article such as the recent one on Pulse Code Modulation are priceless to us who are long away from school and especially if simplified as that one was, a very good way to regain some of our forgotten technical knowledge. I hope to see more such as that.

GLEN S. WATERMAN
Major, Signal Corps
School of Signals
Yorkshire, England

SIR:

The purposes of the AFCA as stated in its constitution were important at the time of its founding. They are even more important today in light of the present critical world tension. An organization carrying out these purposes cannot fail to contribute to our preparedness and national security.

D. C. McKAY
Captain, U. S. Coast Guard
Chief Communication Division

SIR:

The rapid reduction in our members foretells that we may not hold many more reunions and when we hold our last reunion it will mean the dissolution of this association which our Civil War Comrades organized in 1867. I wish you would have in mind the possibility of working out some plan whereby the veterans of the Signal Corps of World Wars I and II could perpetuate our organization. As men grow older they appreciate more the value of an association such as ours. To illustrate—at our New York meeting in July, seven members of one company were able to hold a reunion together and at the Washington reunion three members of the 5th company which was organized in Washington met for the first time since they were discharged fifty years ago. They had served together in Porto Rico. These renewals of friendships formed while in the service take place at nearly all of our reunions. My experience for many years has shown me that it is not difficult to hold men together in an organization of this kind when they know that they are affiliated with men who went through the same experiences that they did. I have no doubt that if some group of Signal Corps veterans set up a headquarters at one of the American Legion conventions and posted signs showing where the headquarters were, they would find a large group of men who will be glad to affiliate with a World Wars division of our association. Our by-laws were adopted by the Civil War Division and our division, when we affiliated with them, provided for the organization of new divisions composed of veterans of future wars. I will be very glad to send you a copy of these by-laws should you be interested in seeing one.

GEORGE A. MARSHALL, Adjutant
U.S. Veteran Signal Corps Asso.

(Ed. Note: Ideas on ways to perpetuate the above organization will be welcomed. Please write AFCA headquarters.)

SIR:

Attended the AFCA meeting at Dayton, Ohio. Sure don't want to miss any SIGNALS and am against any merger of the service magazines as proposed by the *Infantry Journal* which I also take. A combined magazine would not have articles of specific interest to the various branches of the services, even though from an advertising income standpoint it may be desirable. I find the articles in both SIGNALS and the *Infantry Journal* very informative and very well written. Therefore, I hope that SIGNALS will enjoy a long life of supplying information of general and specific interest to those interested in the communication problems which war presents.

(Capt.) FREDERICK E. MUNICH
New York, N. Y.

SIR:

The 1st Signal Troop, 1st Cavalry Division, in cooperation with the Deputy Communications Office of 8th Army successfully staged an overseas radio broadcast over the NBC network from Camp McNair, located on the slopes of Mt. Fuji, 0830, 20 August (Tokyo time). This event was made possible by the wholehearted backing and support of the GHQ Signal Section, FEC, who authorized this endeavor.

Mr. George Folster, NBC representative and correspondent, in Tokyo, Japan, delivered a minute and a half talk on the subject of the 1st Cavalry Division's activities at Camp McNair where the Division was undergoing a CPX at the time of the broadcast. Mr. Folster was the guest of Maj. Gen. William C. Chase, CG, 1st Cavalry Division, during the period in which the final arrangements for setting up the circuit were being completed.

The circuit was set up as follows: The number one and number two carrier channels of a direct VHF circuit, using AN/TRC-1 and associated CF-1B Carrier Equipment, from Camp McNair to Camp Drake were patched through the telephone exchange at Camp Drake to two Japanese land lines to Tokyo Toll Exchange where these circuits were in turn patched through the Japanese equipment to Studio Number 9, Radio Tokyo. There, the two circuits were connected through the transmitter and receiver facilities to the NBC broadcasting studios in San Francisco. A direct Japanese land line circuit from Camp Drake to Tokyo Toll connected to a local telephone in the studio at Radio Tokyo was used for an order wire during the preliminary setting up and testing of the transmit and receive circuits just prior to the broadcast. During the broadcast the other two carrier channels were restricted to eliminate any possible cross-talk, and Mr. Folster used the handset directly connected to channel number 2 of the CF-1B Carrier Equipment for transmitting, and the loudspeaker of Receiver R-19 for a receiver circuit. Mr. Folster's speech was directly recorded in the NBC studios at San Francisco, and shortly thereafter was broadcast over the nation-wide NBC hookup in the United States.

The interesting aspect from a technical standpoint was that this is probably the first time that a broadcast of this nature has been successfully conducted in the FEC on terrain of this sort, using these types of facilities over such great distances. For example, the air line distance of the point to point VHF circuit from Camp McNair to Camp Drake is approximately 50 miles, and there is a high mountain range about five miles from Camp McNair directly in the line-of-sight path to Camp Drake. The signal apparently is reflected off of one or more of the peaks of this mountain range and then travels on down the valley through the rest of the mountains and out across the plains to Camp Drake. The distance from Camp Drake to Tokyo Toll in Tokyo is approximately 15 miles, and the distance from Tokyo Toll to Radio Tokyo is about 2 miles.

R. D. POLLOCK
Lt. Col., Sig C
Div Sig Officer

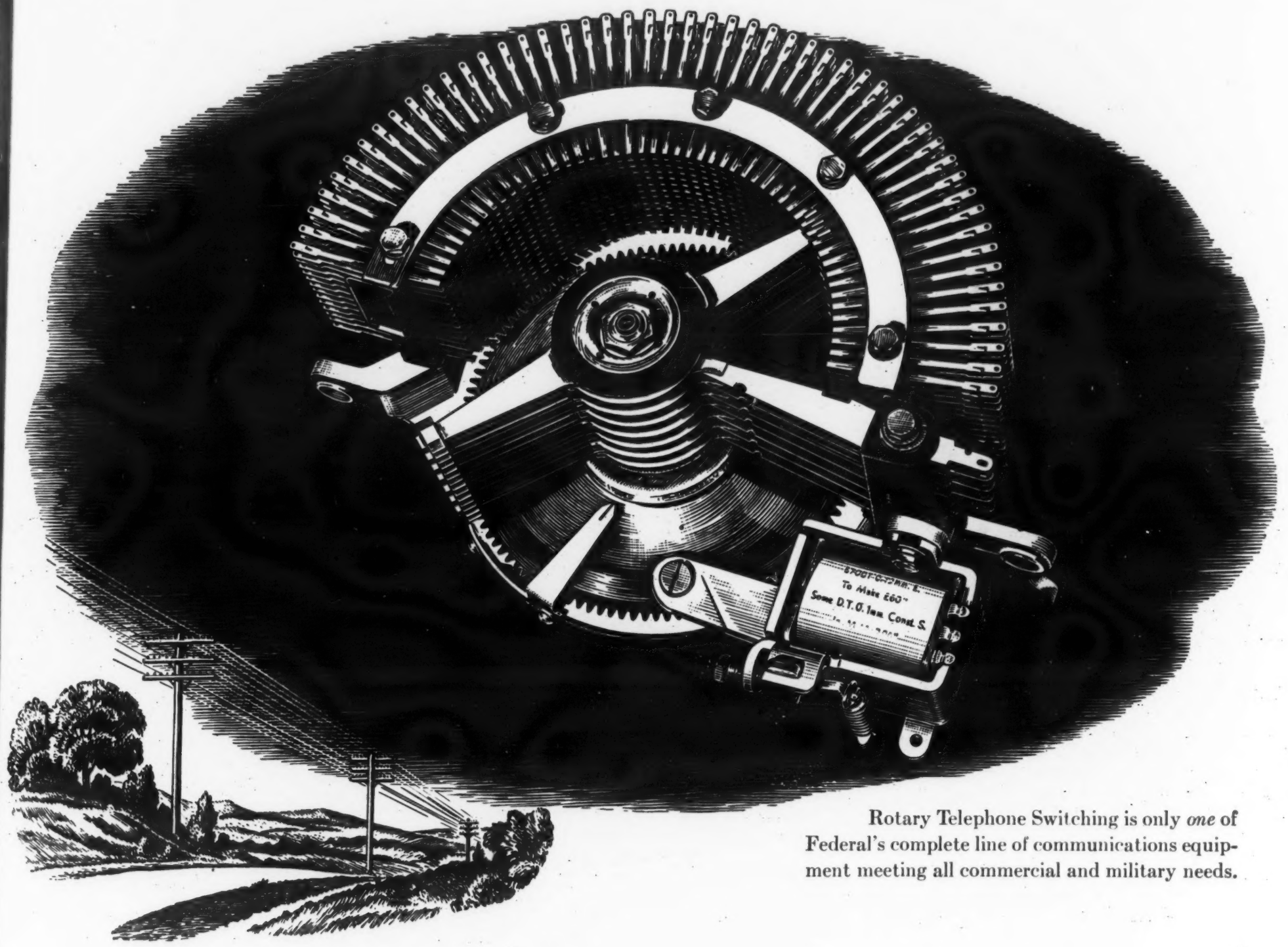
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